5 Early child development

Strategic areas for action

Early child development | Education and training | Healthy lives | Economic participation | Home environment | Safe and supportive communities | Governance and leadership

- Maternal health
- Teenage birth rate
- Birthweight
- Early childhood hospitalisations
- Injury and preventable disease
- Basic skills for life and learning
- Hearing impediments

Providing children with a good start can have a long lasting effect on the rest of their lives. This early stage can open up opportunities for the future, but can also create barriers that prevent children achieving their full potential. Growing up in households with multiple disadvantage can affect children's development, health, social and cultural participation, educational attainment and employment prospects.

Many COAG targets and headline indicators reflect the importance of early child development:

- young child mortality (section 4.2)
- early childhood education (section 4.3)
- substantiated child abuse and neglect (section 4.10).

Other headline indicators are important influences on early childhood outcomes:

- household and individual income (section 4.9)
- family and community violence (section 4.11).

Outcomes in the early child development strategic area can be affected by outcomes in several other strategic areas for action:

- healthy lives (access to primary health, obesity and nutrition) (chapter 7)
- economic participation (income support) (chapter 8)
- home environment (overcrowding, access to functioning water, sewerage and electricity services) (chapter 9)

- safe and supportive communities (alcohol and drug misuse and harm) (chapter 10).

The indicators in the early child development strategic area for action focus on the drivers of long term advantage or disadvantage — improvements in these indicators can contribute over time to improvements in indicators across the framework:

- maternal health — the health of women during pregnancy, childbirth and the period following birth is important for the wellbeing of both women and children. This section reports on measures including access to antenatal services, and alcohol and tobacco consumption during pregnancy (section 5.1)
- teenage birth rate — pregnancy at a young age is generally associated with higher rates of complications during pregnancy and delivery. Teenage births are also associated with lower incomes and poorer educational attainment and employment prospects for the mother (section 5.2)
- birthweight — low birthweight can indicate lack of nutrients or oxygen during particular stages of pregnancy, and is also a key factor affecting infant mortality. Low birth weight is also correlated with poorer health outcomes later in life, including coronary heart disease and type 2 diabetes. This section reports birthweight for babies born to Indigenous mothers (section 5.3)
- early childhood hospitalisations — admissions to hospital typically relate to more serious conditions, and the hospitalisation rate provides a broad indicator of the scale of serious health issues experienced by Indigenous children. A high rate of hospitalisations may also indicate differential access to primary health care, as many hospital admissions could be prevented if more effective non-hospital care were available (see section on injury and preventable disease). This section reports on hospitalisations for all causes for children aged 0 to 4 years (section 5.4)
- injury and preventable disease — the actions of communities and governments can promote the health of children — most childhood diseases and injuries can be successfully prevented or treated without hospitalisation. High rates of injury and preventable disease may indicate underlying issues with child supervision, the living environment or access to health care. This indicator examines injury and preventable diseases that result in children being hospitalised (section 5.5)
- basic skills for life and learning — basic skills for life and learning include a range of social, emotional, language, cognitive and communication skills, as well as general knowledge. The early social and cognitive development of children provides the foundations upon which later relationships and formal learning depend. Only limited data are available for this indicator (section 5.6)

hearing impediments — Indigenous children tend to have high rates of recurring ear infections, which, if not treated early, can become a chronic disease and lead to hearing impediments. As well as direct health impacts, hearing impediments can affect children's capacity to learn and socialise. However, only limited information is available on the burden of hearing loss in Indigenous children. High rates of recurring ear infections are associated with poverty, crowded housing conditions, inadequate access to clean water and functional sewerage systems, nutritional problems and access to health care (section 5.7)

Attachment tables

Attachment tables for this chapter are identified in references throughout this chapter by an 'A' suffix (for example, table 5A.1.1). These tables can be found on the Review web page (www.pc.gov.au/gsp), or users can contact the Secretariat directly.

5.1 Maternal health

Box 5.1.1 **Key messages**

- The proportion of low birthweight babies, pre-term babies and perinatal deaths decreased as the number of antenatal visits increased for both Indigenous and non-Indigenous mothers in 2006 (figures 5.1.3, 5.1.4 and 5.1.5). A lower proportion of Indigenous and than non-Indigenous mothers attended at least five antenatal sessions in Queensland, SA and the NT in 2006 (figure 5.1.1).
- The proportion of Indigenous mothers who attended at least one antenatal session remained constant in most states and territories and increased significantly in SA between 1998 and 2006 (figure 5.1.6).
- Around half of Indigenous mothers smoked during pregnancy and the proportion remained relatively constant between 2001 and 2006 (figure 5.1.7).

Maternal health is a new indicator in the revised indicator framework endorsed by COAG for the 2009 report. COAG anticipates that improved maternal health will contribute to the achievement of its target to 'halve the gap in mortality rates for Indigenous children under five within a decade'. The National Indigenous Reform Agreement agreed by COAG in November 2008 (COAG 2008) included two measures related to maternal health:

- antenatal care
- tobacco smoking during pregnancy.

Maternal health is important both for mothers and their children. Good health during pregnancy contributes to reduced perinatal and infant mortality (section 4.2, Young child mortality) and smaller proportions of low birthweight babies (section 5.3, Birthweight). Good maternal health also reduces the likelihood of maternal death.

This section includes data on use of antenatal care, tobacco use during pregnancy and maternal deaths. There is also discussion of alcohol consumption during pregnancy, but no data are currently available. While much of this section deals with antenatal care, Sivak, Arney and Lewig (2008) found that a family home visiting program for Indigenous babies after birth had positive outcomes for the health and wellbeing of both mothers and babies. Box 5.1.2 includes case studies of some things that are working to improve maternal health and antenatal care.

Box 5.1.2 **Things that work — maternal health**

The **Koori Maternity Strategy** operates across Victoria with the aim of providing culturally appropriate maternity care to Koori women and aligning their birthing experiences and outcomes with those experienced by all Australian women. The program provides both antenatal and postnatal care, antenatal education, birthing support and a health service for children in early childhood. Transport is provided for mothers to facilitate access to the clinic. Aboriginal women still have their babies in the local hospital, but it is not uncommon for them to be discharged after only two days. The birthing program is able to provide support for mothers in this situation, particularly in relation to continuation of breastfeeding after discharge from hospital.

There has been an increase in Koori women accessing antenatal care and earlier in pregnancy. Social networks have improved and better working relationships with mainstream organisations have been established (Dwyer 2005).

The Winnunga Nimmityjah Aboriginal Health Service Aboriginal Midwifery Access Program (AMAP) in the ACT provides community based antenatal and postnatal care to Indigenous women and their babies. Two midwives provide intensive support and care to Indigenous women in a culturally appropriate environment. Evaluation of the program found a high level of acceptance from the community, with improved access and earlier presentation for antenatal care, and improved management of gestational diabetes. Women who had previously experienced difficult pregnancies reported improvement in subsequent pregnancies and the number of low birth weight children was reduced. In 2007 the program was a finalist in the Department of Health and Ageing's 'National Excellence Awards in Aboriginal and Torres Strait Islander Health — Service Delivery' category (ACT Government unpublished).

(Continued next page)

Box 5.1.2 (continued)

The Community Midwifery Programme (CMP) in Elizabeth, SA, is a midwifery led care model in which a midwife cares for designated clients through the continuum of pregnancy, birth and the period after birth, offering appropriate models of care for Indigenous women. Birthweight of Indigenous babies within the program is generally higher than for those birthed outside of the program (SA Government unpublished).

The Anangu Bibi Family Birthing Program in Port Augusta and Whyalla (SA) was introduced following consultations with Aboriginal women, communities and agencies. Aboriginal Maternal and Infant Care (AMIC) workers and midwives work together in partnership to provide antenatal, birthing and early childhood care to Aboriginal women. Midwives have developed a better appreciation of Aboriginal culture and AMIC workers have improved their clinical skills and knowledge. AMIC workers have encouraged more Aboriginal women to visit midwives for antenatal care and together the AMIC workers and midwives have ensured that Aboriginal women have felt welcome in the hospital and have received appropriate care. There has been an increased use of the services and, anecdotally, reductions in low birthweight babies, decreases in smoking, increases in breastfeeding and increases in the number of women having more than seven antenatal visits (Stamp et al. 2008).

Antenatal care

Antenatal care includes assessment of the health of pregnant women and their developing babies, screening tests, education and advice on healthcare during pregnancy and delivery, and the identification and management of conditions that may be harmful to health during pregnancy (WHO 2009).

Access to primary health care can make a difference to the health of women of childbearing ages and women during pregnancy, as well as fetuses during growth and development, infants and young children (Eades 2004). Antenatal care may be especially important for Indigenous women as they are at higher risk of giving birth to low birthweight babies. Risk factors that can be addressed through antenatal care include anaemia, poor nutrition, hypertension, diabetes and glucose intolerance, genital and urinary tract infections, and smoking (AHMAC 2008). Antenatal care also provides an opportunity to educate mothers about breastfeeding, which has benefits for both the mother and child (Queensland Health 2003). Zubrick et al. (2004) found that mothers of Aboriginal children in WA, particularly those living in more isolated areas, were both more likely to initiate breast feeding and to breast feed for longer than mothers in the general population.

The optimal number of antenatal care visits is the subject of some debate and the commonly used protocols in Australia are not always consistent with research evidence (Hunt and Lumley 2002). National antenatal care guidelines are being developed. Most guidelines suggest that antenatal care start in the first trimester (first three months) of pregnancy so that risk factors can be identified at an early stage (Mercy Hospital for Women, Southern Health Service and Women's & Children's Health Service 2001). After the first visit, antenatal care often follows the standard schedule monthly visits to 28 weeks, fortnightly visits to 36 weeks and then weekly visits until birth (Dodd, Crowther and Robinson 2002; Hunt and Lumley 2002). However, research shows that seven to ten visits may be sufficient for low risk women (Mercy Hospital for Women, Southern Health Service and Women's & Children's Health Service 2001; Wallace and Oats 2002).

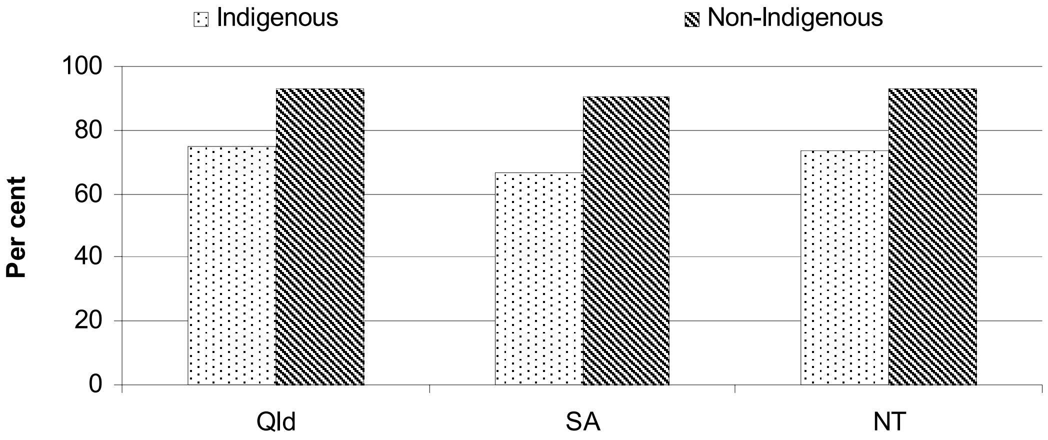
This section provides data on the proportions of women attending their first antenatal visit during the first trimester and the proportion attending at least five antenatal visits during their pregnancy. These are presented as the minimum requirements for good antenatal care.

The proportion of low birthweight babies, pre-term (premature) babies and perinatal deaths decreased as the number of antenatal visits increased for both Indigenous and non-Indigenous mothers in 2006.

- For Indigenous mothers who did not attend any antenatal sessions 41.6 per cent had babies of low birthweight, while for Indigenous mothers who attended five or more antenatal sessions only 8.5 per cent had babies of low birthweight (table 5A.1.3).
- For Indigenous mothers who did not attend any antenatal sessions 40.2 per cent had pre-term babies, while for Indigenous mothers who attended five or more antenatal sessions only 8.6 per cent had pre-term babies (table 5A.1.4).
- For Indigenous mothers who did not attend any antenatal sessions 9.3 per cent resulted in perinatal deaths, while for Indigenous mothers who attended five or more antenatal sessions only 0.7 per cent resulted in perinatal deaths (table 5A.1.5).

Section 5.3 provides more information on birthweight. Perinatal and infant deaths are discussed in more detail in section 4.2 (Young child mortality).

Figure 5.1.1 **Mothers who attended five or more antenatal sessions, by State/Territory, 2006**[a, b]



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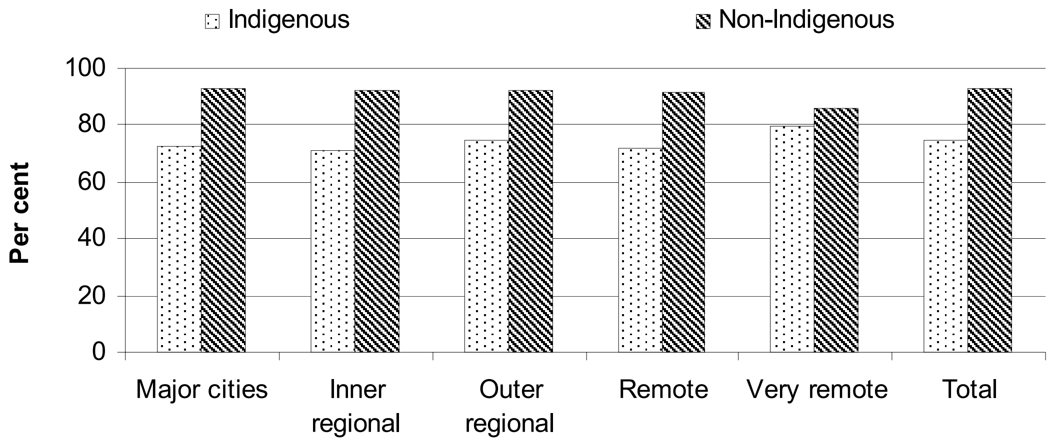
[a] Per cent of women who gave birth in the period, whether resulting in a live or still birth, if the birthweight was at least 400 grams or the gestational age was 20 weeks or more. Excludes births where mother's Indigenous status was not stated. [b] Data not available for NSW, Victoria, WA and Tasmania. Data are available in the ACT but not of sufficient quality to publish. Jurisdiction level data are based on place where birth occurred, not place of usual residence.

Source: AIHW analysis of State/Territory perinatal collections (unpublished); table 5A.1.1.

- In 2006, a lower proportion of Indigenous than non-Indigenous mothers attended at least five antenatal sessions in Queensland, SA and the NT (figure 5.1.1).
- Data on the duration of pregnancy at the first antenatal visit are only available for NSW. In 2006, 54.0 per cent of Indigenous mothers and 63.7 per cent of non-Indigenous mothers attended their first antenatal session during the first trimester (first 12 weeks) of pregnancy (table 5A.1.1).

Figure 5.1.2 **Mothers who attended five or more antenatal sessions, Queensland, SA and the NT combined by remoteness, 2006[a, b, c]**



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[a] Per cent of women who gave birth in the period, whether resulting in a live or still birth, if the birthweight was at least 400 grams or the gestational age was 20 weeks or more. Excludes births where mother's Indigenous status was not stated. [b] Data not available for NSW, Victoria, WA and Tasmania. Data are available in the ACT but not of sufficient quality to publish. [c] Total includes unknown remoteness category.

Source: AIHW analysis of State/Territory perinatal collections (unpublished); table 5A.1.2.

- In 2006, lower proportions of Indigenous than non-Indigenous mothers attended five or more antenatal sessions in all remoteness areas in Queensland, SA and the NT combined. Indigenous mothers were more likely to attend five or more antenatal sessions in very remote areas than in other remoteness areas (figure 5.1.2).
- Data on the duration of pregnancy at the first antenatal visit are only available for NSW. In 2006, 63.8 per cent of Indigenous mothers outer regional areas in NSW attended their first antenatal visit in the first trimester (12 weeks) of pregnancy compared with 43.8 per cent of those in very remote areas of NSW (table 5A.1.2).

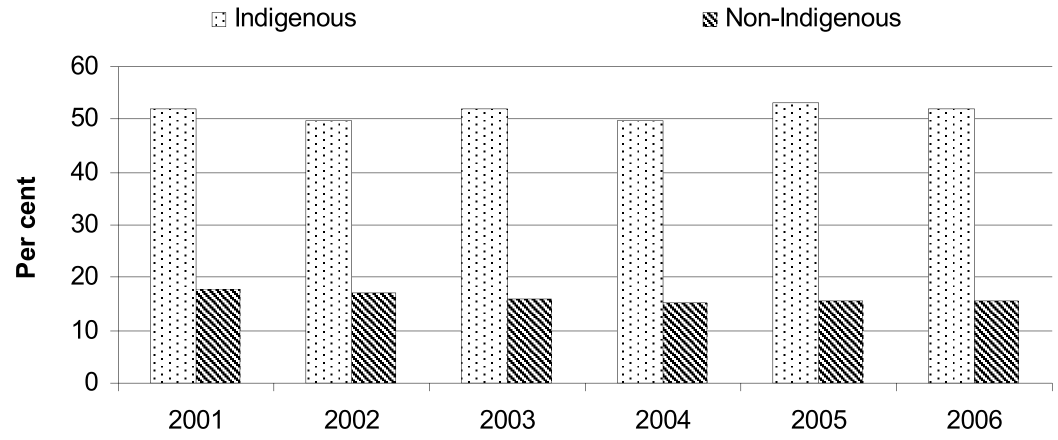
Data are available from 1998 to 2006 on the proportion of pregnant mothers attending at least one antenatal care session. Between 1998 and 2006, the proportion of Indigenous mothers who attended at least one antenatal session remained constant in most states and territories and increased significantly in SA. The proportion of both Indigenous and non-Indigenous mothers attending at least one antenatal session was well over 90 per cent in most states and territories except SA over the period (table 5A.1.6).

Attendance of at least one antenatal care session has some benefit. However, available data presented demonstrate that attendance at five or more antenatal care sessions by pregnant women has significant positive outcomes for their babies. In future editions it would be useful to be able to present time series data on the proportion of mothers attending at least five antenatal care sessions.

Tobacco consumption during pregnancy

Smoking in pregnancy can lead to miscarriage, stillbirth or premature birth (Graham et al. 2007; Gilligan et al. 2007; Wills and Coory 2008; Walters 2009) and low birthweight. Low birthweight infants are at a greater risk of dying during the first year of life and are prone to ill health in childhood. The negative health effects of tobacco smoking may continue after birth if one or both parents smoke. Passive smoking has been linked with higher rates of respiratory illness, sudden infant death syndrome (SIDS), asthma and ear infections in children (Jacoby et al. 2008), and lung cancer and heart disease in adults (DHA 2003, 2004). Wood et al. (2008) explored some of the barriers to Indigenous women ceasing smoking during pregnancy.

Figure 5.1.3 **Mothers reporting smoking during pregnancy**[a, b, c]



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[a] 2001 to 2004 data are for NSW, WA, SA, the ACT and NT only. Smoking during pregnancy data were only available for these five jurisdictions. [b] 2005 data are for NSW, WA, SA, Tasmania, the ACT, the NT and include 6 months of Queensland data. For Queensland, smoking status data were collected from 1 July 2005, therefore, 2005 figures only include the July-December period for Queensland. [c] 2006 data exclude Victoria (include NSW, Queensland, WA, SA, Tasmania, the ACT and NT)

Source: AIHW National Perinatal Statistics Unit reports: *Smoking and Pregnancy*, Cat. no. PER 33; *Australia's Mothers and Babies 2004*, Cat. no. PER 34; *Australia's Mothers and Babies 2005*, Cat. no. PER 40; *Australia's Mothers and Babies 2006*, Cat. no. PER 46; table 5A.1.7.

- In 2006, 52.2 per cent of Indigenous mothers and 15.6 per cent of non-Indigenous mothers reported smoking during pregnancy (figure 5.1.3).
- Between 2001 and 2006, around half of Indigenous mothers smoked during pregnancy and the proportion remained relatively constant. The proportion of

non-Indigenous mothers smoking during pregnancy declined slightly from 17.8 to 15.6 per cent (figure 5.1.3). Data on proportions of pregnant mothers smoking over time should be interpreted with caution, as the number of states and territories for which data are available has changed over time.

Zubrick et al. (2004) found that, across all levels of relative isolation in WA, the proportion of mothers of Aboriginal infants who used tobacco during their pregnancy was twice that of mothers in the general population.

Alcohol consumption during pregnancy

It is well documented that heavy alcohol consumption during pregnancy is a risk factor for fetal alcohol syndrome (O'Leary et al. 2007; NHMRC 2001; World Bank 2000). Fetal alcohol syndrome is characterised by various combinations of growth restriction of the fetus, facial anomalies, microcephaly and central nervous system impairment, including intellectual disability and behaviour problems (O’Leary 2004; Rothstein, Heazlewood and Fraser 2007; World Bank 2000). Abstaining from drinking alcohol during pregnancy will prevent fetal alcohol syndrome. Alcohol exposure can also cause a range of other alcohol related birth defects, known as fetal alcohol spectrum disorder (O'Leary et al. 2007). Fetal alcohol spectrum disorder may lead to a range of a range of physical, behavioural, and cognitive effects.

There are few data available on alcohol consumption by Indigenous females during pregnancy. One study gathered data through a survey administered as part of a health screening program conducted from 1998 to 2000 at 45 rural and remote locations in north Queensland. The ‘Well Persons Health Check’ found that 25 per cent of pregnant Indigenous women reported drinking at hazardous and harmful levels in the week prior to the survey (Queensland Health Tropical Population Health Network unpublished).

In Australia, the lack of data on the prevalence of fetal alcohol syndrome or fetal alcohol spectrum disorder is a barrier to obtaining a true estimate of its prevalence in the Indigenous population. However, these disorders can be difficult to diagnose. One study in far north Queensland estimated a fetal alcohol spectrum disorder prevalence of 1.5 per cent in the Aboriginal child population, with a prevalence of 3.6 in one Cape York community (Rothstein, Heazlewood and Fraser 2007). In contrast, the highest reported prevalence outside Australia is 0.5 per cent in South Africa (Abel and Hannigan 1995).

Elliott et a. (2008) reported on an active national case finding study of fetal alcohol syndrome. The data are based on monthly reporting of incident cases aged less than

15 years by over 1150 paediatricians between January 2001 and December 2004. Ninety-two cases of fetal alcohol syndrome were reported during the period, of which 65 per cent were Indigenous.

Maternal deaths

Data on Indigenous maternal mortality should be interpreted with caution as Indigenous identification is incomplete and numbers of deaths are small and a small variation in numbers from one year to the next can significantly alter rates. Small numbers of both Indigenous and non-Indigenous women die during pregnancy and childbirth. For the period 2003–05, there were six maternal deaths of Indigenous women. Two were directly related to complications of pregnancy and childbirth, while the other four were from causes not related to pregnancy or childbirth, but which may have been aggravated by the effects of pregnancy (AIHW 2009).

Table 5.1.1 **Indigenous maternal mortality rates 1991–1993 to 2003–2005**

Years	*Deaths*	*Total Indigenous confinements*[a]	*Indigenous maternal mortality rate*[a]	*Non-Indigenous maternal mortality rate*[a, b]	*Rate ratio*[c]
1991–1993	5	21 539	23.2	5.9	3.9
1994–1996	4	22 996	17.4	8.3	2.1
1997–1999	6	25 530	23.5	6.7	3.5
2000–2002	12	26 128	45.9	8.7	5.3*
2003–2005	6	27 901	21.5	7.4	2.9

* Represents results with statistically significant differences in the Indigenous/non-Indigenous comparisons at the p<0.05 level.

[a] Rate per 100 000 confinements calculated using direct and indirect deaths only. Excludes incidental deaths. [b] For 1991–1993 and 1994–1996, the non-Indigenous maternal mortality rate includes non-Indigenous deaths and deaths where Indigenous status is unknown. For 1997–1999, 2000–2002 and 2003–2005, deaths where Indigenous status is unknown have been excluded. [c] Maternal mortality rate for Indigenous mothers divided by maternal mortality rate for non-Indigenous mothers.

Source: AIHW (2009) *Aboriginal and Torres Strait Islander Health Performance Framework 2008 Report: Detailed Analyses*.

- The maternal mortality rate for Indigenous women between 1991–1993 and 2003–2005 ranged from 17.4 per 100 000 to 45.9 100 000 (table 5.1.1).
- Although maternal mortality rates for Indigenous women were between two and five times the rates for non-Indigenous women between 1991–1993 and 2003–2005, these differences were generally not statistically significant (table 5.1.1).

5.2 Teenage birth rate

Box 5.2.1 **Key messages**

- Teenage birth rates were much higher for Indigenous females than non-Indigenous females in both 2004 and 2007 (figure 5.2.1).
- 18.0 per cent of Indigenous births were to teenage mothers in 2007. In contrast, 3.2 per cent of non-Indigenous births were to teenage mothers (figure 5.2.3).
- The proportion of Indigenous births to teenage mothers increased with remoteness and was highest in very remote areas between 2001 and 2007 (figure 5.2.4).

Teenage birth rate has been included as a new indicator in the 2009 report because of the additional risks associated with teenage births — risks to both the mother and the baby. Indigenous teenagers have a much higher birth rate than non-Indigenous teenagers. In 2007, 18.0 per cent of Indigenous births were to teenage mothers (figure 5.2.3). In contrast, 3.2 per cent of non-Indigenous births were to teenage mothers (figure 5.2.3).

This section analyses patterns in teenage births by the Indigenous status of the baby and of the mother, by the mother's age, by remoteness area, and by State and Territory.

Australia's teenage birth rate of 16.3 babies per 1000 females in 2003 was low compared to other English speaking countries, including the United States (51.1 per 1000), New Zealand (29.8 per 1000), United Kingdom (29.7), and Canada (20.1) (Morehead and Soriano 2005). However, Australia's teenage birth rate is moderate compared to other OECD countries. In 2005, of 36 OECD countries Australia had the 15th highest teenage birth rate (OECD 2008). Teenage birth rates are much higher in less developed countries and are in excess of 100 babies per 1000 women in some developing countries (UNFPA 2004).

As the data in this section demonstrate, Indigenous birth rates are much higher in Australia than non-Indigenous birth rates. Indigenous births are also much more likely to be to teenage mothers, relative to non-Indigenous births. Luong (2008), notes that for Canadian Aboriginals, teenage pregnancy is much more common than for other Canadians. Teenage pregnancy is also much more common for Maori than other New Zealanders (Dickson et al. 2000).

Many studies have measured the association between teenage pregnancy and the likelihood that the mother or child will experience socio-economic disadvantage both at the time of birth and later in the mother's or child's life. Jeon, Kalb and Vu (2008) examined welfare participation among Australian teenage mothers and found a strong association between welfare participation and being a teenage mother. They found that, on average, teenage mothers left school much earlier than females who did not become teenage mothers. The study found that 165 (19.7 per cent) of 839 teenage mothers in the sample left school at the age of becoming a mother or a year before the event. Most teenage mothers in the study left school at the age of 15 or 16, before they were pregnant. In Australia, teenage mothers are overrepresented among recipients of the main income support payment for single mothers (Morehead and Soriano 2005). In Britain, teenage mothers are more likely to experience socio-economic disadvantage later in life, including being more likely to partner an unemployed or low income earning man and being much less likely to own a home (Ermisch 2003).

There are also concerns about heightened physical health risks to teenage mothers and their babies. Research shows that mothers aged over 35 are more likely to have complications (Jolly et al. 2000) relative to mothers in their 20s and early 30s. However, teenagers, especially younger teenagers who are not fully grown, have much higher risks of complications for themselves and their baby. Younger teenage mothers are more likely to give birth to low birthweight babies (Hendrickson 1998). Babies who are born with a low birthweight (under 2500 grams) have heightened risks for a number of health complications (for more discussion of low birthweight babies see section 5.3).

There are also concerns about how the emotional maturity of teenager mothers and the support they receive from their families affects their capacity to care for their children. Evidence suggests that teenage mothers are less likely to attend antenatal clinics (NSW Health 2009) (section 5.1 discusses antenatal care in more detail). Teenage mothers are also more likely to experience depression than older mothers (Liao 2003). In Australia, teenage mothers are overrepresented among disability support payment recipients (Jeon, Kalb and Vu 2008). Zubrick et al. (2004) found that the care of children born to early teenage mothers was more likely to be transferred to others, which poses risks to the child.

Research suggests that daughters of teenage mothers are much more likely to become teenage mothers themselves (Anderson and Kahn 1992).

Teenage mothers are more likely to come from disadvantaged backgrounds and are more likely to be disadvantaged later in life. Notwithstanding the strong association between socio-economic disadvantage and teenage motherhood, causation is difficult to determine (Bradbury 2006; Hotz, McElroy and Sanders 2005).

This section defines a teenage birth as a birth where the mother is under the age of 20 at the time of birth. There are a small number of births to girls under the age of

13 which are counted as teenage births in this section. This section examines the following three types of births:

- Indigenous births — births where at least one parent is Indigenous
- births to Indigenous mothers — births where the mother is Indigenous
- non-Indigenous births — births where both the mother and father are non-Indigenous.

Births to Indigenous mothers is a subset of Indigenous births. In 2007, births to Indigenous mothers comprised 71.8 per cent of Indigenous births (table 5A.2.7).

Programs have been developed to assist teenage and young mothers to care for their children. Box 5.2.2 provides an example of a program designed to assist young Indigenous mothers.

Box 5.2.2 **'Things that work' — The Nunga Young Mums Program**

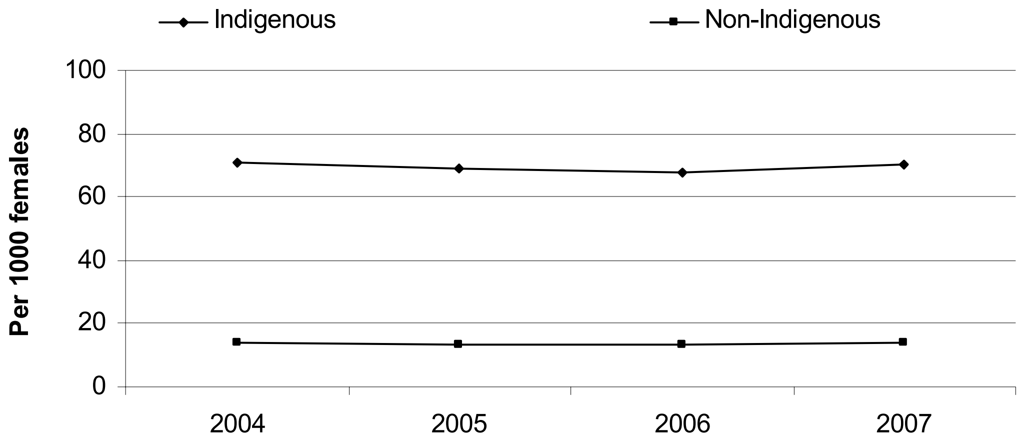
The Nunga Young Mums Program is based on the Incredible Years Program, an evidence based program from the United States. The program targets young mums (under 25s), uses a place that is already familiar and promotes the program in a way that is personal and sensitive to possible shame issues around parenting.

The Nunga Young Mums Program promotes the use of principles of play and attention, praise and rewards, limit setting, ignoring and distracting and then time out. The principles are ranked in order of importance, the greatest focus being on the play and attention and least focus on time out. In consultation with Nunga program leaders the principles are focussed by the use of an adapted parenting pyramid depicting a fruit tree with its roots representing the child.

The program was developed using a partnership approach and the language has been adapted to be culturally appropriate. Child and Adolescent Mental Health Services are currently exploring opportunities to expand this program in 2009.

The initial 16 week program was commenced with 7 Indigenous mums and 13 Indigenous children. The children were involved through the content, conversation and homework tasks of the parents each week. One family outing was held during the school holidays which 7 children attended. The initial program goal was to learn about children and how to participate as part of a group. A number of participants from the initial program have requested to join the program this year, so that they can continue developing their parenting skills and support other mums in the program (SA Government, unpublished).

Figure 5.2.1 **Teenage birth rate (females aged 15–19 years), by Indigenous status of mother, 2004–07[a]**



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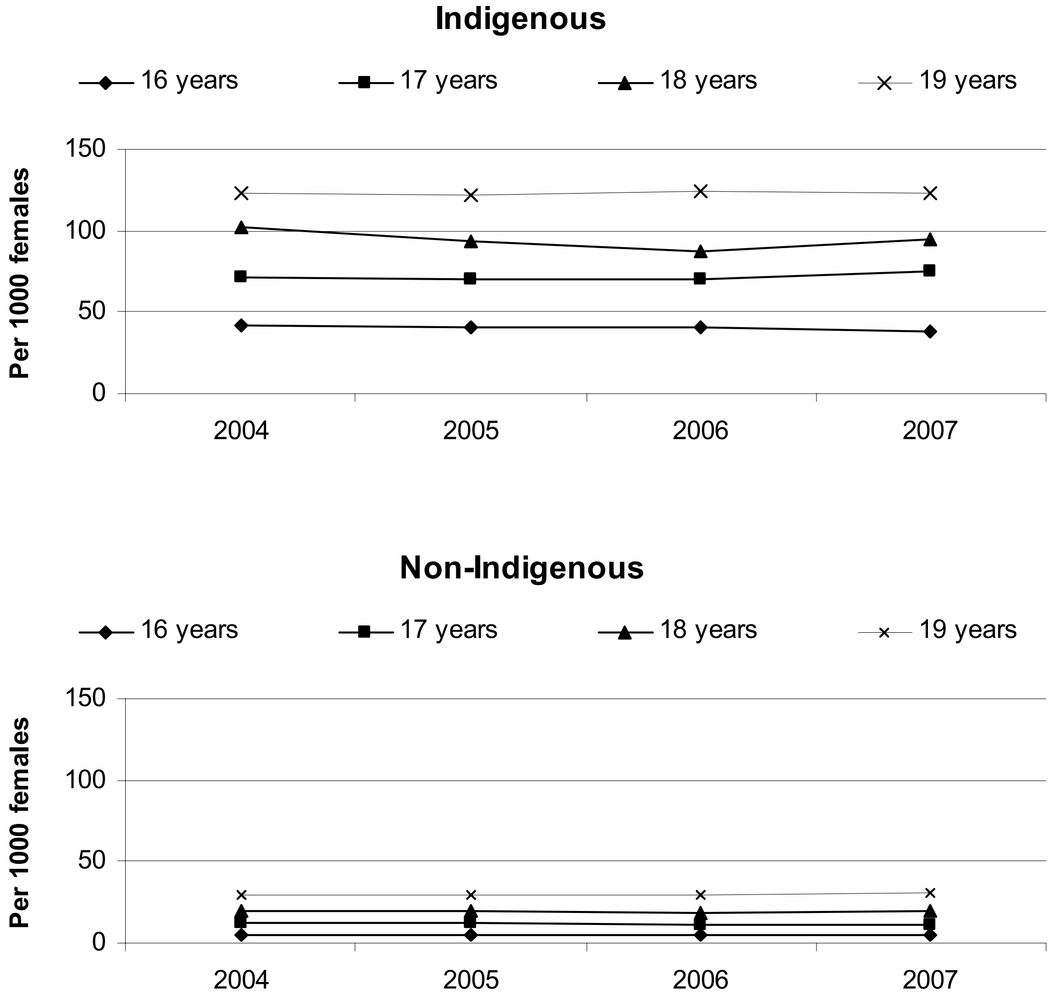
[a] The teenage birth rate in this analysis is calculated using the total number of births to females aged under 20 at the time of birth divided by the female population aged 15 to 19 years. A small number of births are to females under the age of 15. This means that teenage birth rates are slightly inflated.

Source: ABS *Births, Australia 2004–07*; ABS (unpublished) derived from *Experimental Estimates of the Aboriginal and Torres Strait Islander Population* Cat no. 3238.0; ABS (unpublished) derived from *Australian Demographic Statistics* Cat no. 3101.0; table 12A.2.23.

Between 2004 and 2007:

- teenage birth rates were much higher for Indigenous teenagers than all teenagers (figure 5.2.1)
- the teenage birth rate for Indigenous teenagers remained stable (70.9 per 1000 in 2004 and 70.1 per 1000 in 2007). The teenage birth rate for non-Indigenous teenagers also remained stable (13.8 per 1000 in 2004 and 13.7 in 2007) (figure 5.2.1).

Figure 5.2.2 **Teenage birth rate, by age of mother, 2004–07**



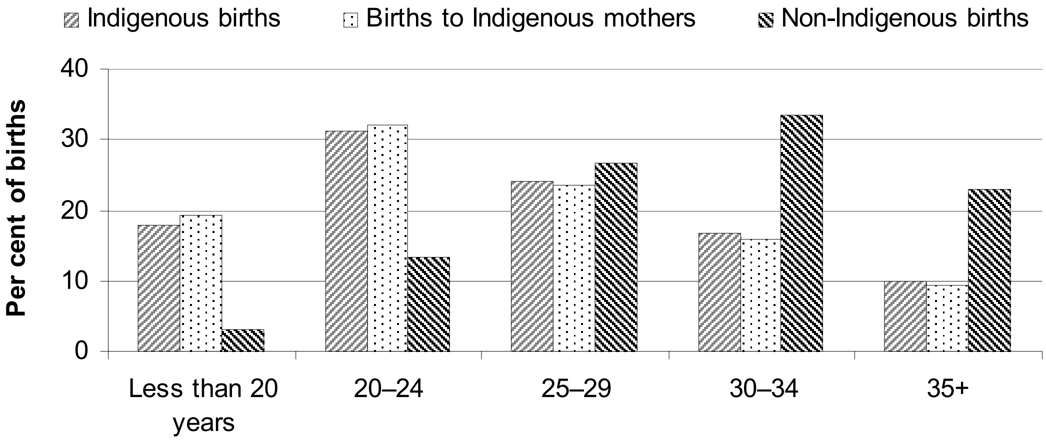
Source: ABS *Births, Australia 2004–07*; ABS (unpublished) derived from *Experimental Estimates of the Aboriginal and Torres Strait Islander Population*; table 5A.2.21.

Between 2004 and 2007:

- birth rates for Indigenous females aged 16–19 years increased for each single year of age, and were much higher than birth rates for non-Indigenous females (figure 5.2.2)
- birth rates for Indigenous females or non-Indigenous females aged 16, 17, 18 and 19 years were relatively stable over time (figure 5.2.2).

Birth rates for Indigenous females aged 16, 17, 18 and 19 years are reported for some states and territories for 2004–07 in attachment table 5A.2.21. A similar proportion of Indigenous births and births to Indigenous mothers were to mothers aged under 16 years (1.3 per cent and 1.5 per cent, respectively, in 2007) (table 5A.2.7). A much smaller proportion of non-Indigenous births were to mothers under the age of 16 (0.1 per cent) (table 5A.2.7).

Figure 5.2.3 **Births, by Indigenous status of baby and mother, and age of mother, 2007**[a]



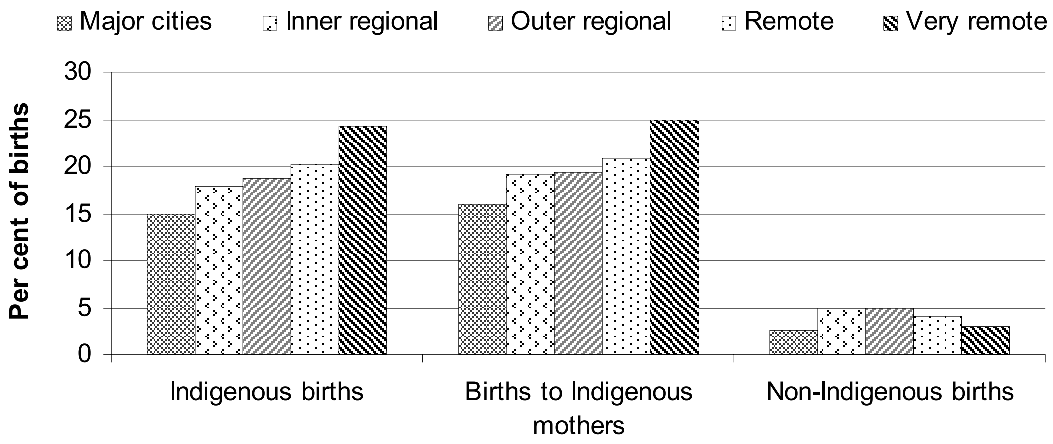
[a] Indigenous births are births where at least one parent is Indigenous.

Source: ABS *Births, Australia 2007* (unpublished); table 5A.2.18.

In 2007:

- the distribution of mothers' age at birth was similar for Indigenous births and births to Indigenous females, but very different for non-Indigenous births (figure 5.2.3)
- 18.0 per cent of Indigenous births and 19.3 per cent of births to Indigenous mothers were to teenage mothers (figure 5.2.3). In contrast, 3.2 per cent of non-Indigenous births were to teenage mothers (figure 5.2.3)
- Indigenous births and births to Indigenous mothers were also much more likely than non-Indigenous births to be to mothers aged 20–24 years and much less likely to be to mothers aged 30 years and over (figure 5.2.3).

Figure 5.2.4 **Proportion of births to teenage mothers, by Indigenous status of baby and remoteness, 2007**[a, b]



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[a] Indigenous births are births where at least one parent is Indigenous. [b] Remoteness area data exclude births where place of usual residence is undefined, overseas, offshore and migratory and where data are otherwise uncodeable. Remoteness areas are approximated due to converting births by statistical local area to remoteness areas.

Source: ABS *Births, Australia 2001–07* (unpublished); table 5A.2.8.

In 2007:

- for all remoteness areas, similar proportions of Indigenous births and births to Indigenous women were to teenage mothers. In contrast, a much lower proportion of non-Indigenous births were to teenage mothers (figure 5.2.4)
- the proportion of Indigenous births to teenage mothers increased with remoteness and was highest in very remote areas (24.3 per cent of births) (figure 5.2.4). The proportion of births to Indigenous teenage mothers also increased with remoteness and was highest in very remote areas (24.9 per cent) (figure 5.2.4). In contrast, the proportion of non-Indigenous births to teenage mothers was highest in inner regional and outer regional areas (4.9 per cent and 4.8 per cent, respectively) and lowest in major cities and very remote areas (2.5 per cent and 2.9 per cent, respectively) (figure 5.2.4).

Between 1998 and 2007:

- the proportion of Indigenous births to teenage mothers and births to Indigenous teenage mothers was much higher than the proportion of non-Indigenous births to teenagers in all years and in all states and territories (tables 5A.2.9–18)
- the proportion of Indigenous births to teenage mothers fell slightly in the NT but exhibited no clear trend in other jurisdictions (tables 5A.2.9–18). In contrast, the

proportion of non-Indigenous births to teenage mothers fell in NSW, Victoria, Queensland, WA, the ACT and the NT (tables 5.2.9–18)

- the proportion of Indigenous births to teenage mothers was higher in the NT and WA and lowest in Victoria (tables 5.2.9–18). The proportion of births to Indigenous mothers where the mother was a teenager was also higher in the NT and WA and lower in Victoria (tables 5.2.9–18). In contrast, the proportion of non-Indigenous births to teenage mothers was highest in Tasmania (tables 5.2.9–18).

5.3 Birthweight

Box 5.3.1 **Key messages**

- Indigenous mothers (12.9 per cent) were almost twice as likely as non-Indigenous mothers (6.1 per cent) to have a low birthweight baby in the period 2004–06 (table 5.3.2).
- The average birthweight of babies born to Indigenous mothers during 2004–06 was 3162 g, compared with 3379 g for babies born to non-Indigenous mothers — a difference of 217 g, or 6.4 per cent (table 5.3.2).

The birthweight of a baby is a key indicator of health status. Children with low birthweights require longer periods of hospitalisations after birth and are more likely to have poor health, or even die in infancy (ABS and AIHW 2008). Low birthweight can also have long-term influences on the development of chronic diseases in adulthood, including diabetes and heart disease (Mackerras 1998; Fall et al. 1995). For many Indigenous children, health risks associated with low birthweight are compounded by high rates of infectious disease and poor infant nutrition (Singh and Hoy 2003).

Low birthweight is defined as less than 2500 g. Within this category, babies weighing less than 1500 g are considered to be of very low birthweight, and those less than 1000 g, of extremely low birthweight (AIHW 2008b). Generally, a higher proportion of female infants are born with a low birthweight than male infants. However, female infants tend to do better than male infants of the same weight.

Low birthweight may be a result of being born early (pre-term), although the infant may be within the expected size range for its gestational age. Alternatively, the infant may be small for its gestational age (fetal growth retardation). Low birthweight can also result from a combination of these two factors (ABS and AIHW 2008). Mackerras (1998) and Sayers and Powers (1997) identified fetal growth retardation as the main cause of low birthweight among Indigenous babies born in non-remote areas. Conversely, Rousham and Gracey (2002), in a study of Indigenous infants in the Kimberley region of WA, identified pre-term birth as the more likely cause of low birthweight in this rural population.

Predictors for fetal growth retardation and pre-term birth are listed in table 5.3.1. Some predictors cannot be altered, for example, infant sex or race, while others may take at least a generation to change, including maternal birthweight. Other predictors might be influenced in the short-term, including maternal weight or cigarette smoking (ABS and AIHW 2003). There is incontrovertible evidence that smoking harms unborn babies (Wills and Coory 2008). Indigenous mothers smoked during pregnancy at more than three times the rate for non-Indigenous mothers (section 5.1). Teenage pregnancies are also associated with lower birth weights and Indigenous teenagers have a much higher birth rate than non-Indigenous teenagers. In 2007, 18.0 per cent of Indigenous births were to teenage mothers while in contrast 3.2 per cent of non-Indigenous births were to teenage mothers (section 5.2).

Table 5.3.1 Predictors of fetal growth retardation and pre-term birth[a]

	Fetal growth retardation	*Pre-term birth*
Direct	infant sex, race/ethnic origin, maternal height, maternal pre-pregnancy weight, paternal height and weight, maternal birthweight, parity[b], prior low birthweight infant, gestational weight gain, energy intake, general morbidity, malaria, maternal cigarette smoking, alcohol consumption, and tobacco chewing.	maternal pre-pregnancy weight, prior preterm birth, prior spontaneous abortion, maternal cigarette smoking, in utero diethylstilboestrol[c] exposure, maternal diabetes, urogenital infections, bacterial vaginosis, and placental, cervical or uterine abnormalities.
Indirect	very young maternal age, socio-economic status (including maternal education)	

[a] Excludes deliveries in women with an underlying chronic illness. [b] Parity is the number of previous pregnancies resulting in live births or stillbirths (of 20 weeks gestation or 400g birthweight). [c] Diethylstilboestrol is a drug prescribed widely from the 1940s to 1970s that has been associated with increased risks of vaginal and cervical cancers and other disorders in people who were exposed to the drug in the uterus when their mothers were given it while pregnant.

Source: Mackerras 1998.

One factor that may reduce the incidence of low birthweight in the long term is increased access to antenatal care. Although most Indigenous women are known to access antenatal care at some point during pregnancy, access generally occurs later in the pregnancy and less frequently than for non-Indigenous women (Plunkett et al. 1996). Increased antenatal care in the first trimester may allow opportunities for the identification and possible modification of health risk factors (such as smoking). Section 5.1 provides data on Indigenous mothers' use of antenatal care services.

Some Indigenous women face difficulties in accessing antenatal care, such as a lack of local facilities or suitable transport, cost, and a lack of culturally appropriate programs. The effectiveness of Aboriginal culturally specific antenatal programs has been illustrated through Australian research. Culturally specific programs delivered by Aboriginal health care workers, together with perinatal health care professionals, deal with prevalent risk factors to reduce the incidence of low birthweight (SA Health 2009). A study undertaken by the Nganampa Health Council on people residing in the Anangu Pitjantjatjara Lands in the far north-west of SA found that better antenatal care for expectant mothers led to positive outcomes in perinatal mortality and improved birthweights (ABS and AIHW 2003).

In addition to antenatal care the following factors may also assist in reducing low birthweight in the long term:

- introducing nutritional assessment and monitoring into prenatal care, with evaluation of their use and effectiveness
- better targeted and more effective health promotion programs
- evaluating strategies to improve maternal nutrition by increased weight gain during pregnancy (Mackerras 1998).

The analyses in this section are based on data from the AIHW National Perinatal Statistics Unit. Each jurisdiction has a perinatal data collection in which midwives and other staff, using information obtained from mothers and from hospital or other records, complete notification forms for each birth. Information on Indigenous people based on hospital records is limited by the accuracy with which Indigenous people are identified in these records (see appendix 3). Not all Indigenous mothers are identified as Indigenous, therefore, not all births to Indigenous mothers are recorded as Indigenous. There are also problems with the reliability of data from jurisdictions with small numbers of babies born to Indigenous mothers. Caution needs to be exercised when examining data from these jurisdictions.

The perinatal statistics do not record any information about the father. Therefore, births in the Indigenous population reported here only include births to Indigenous mothers, and do not include births to Indigenous fathers and non-Indigenous mothers. Hence, these figures underestimate the total number of Indigenous babies born in a given period. Over the period 2003–2005, for example, 28 per cent of registered Indigenous births were to Indigenous fathers and non-Indigenous mothers (AIHW 2008a and Leeds et al. 2007).

Table 5.3.2 **Birthweight, by live births and fetal deaths, 2004–2006**[a, b]

Births to Indigenous mothers[c]	*Live births*		*Fetal deaths*[d]		*Total births*	
Mean birthweight (grams)	3 162		1 261		3 140	
	no.	%	no.	%	no.	%
Low birthweight (<2500g)	3 743	12.9	274	81.3	4 017	13.7
Very low birthweight (<1500g)	700	2.4	230	68.2	930	3.2
Extremely low birthweight (<1000g)	327	1.1	196	58.2	523	1.8
All births	28 961	100.0	337	100.0	29 298	100.0
Births to non-Indigenous mothers	*Live births*		*Fetal deaths*		*Total births*	
Mean birthweight (grams)	3 379		1 237		3 364	
	no.	%	no.	%	no.	%
Low birthweight (<2500g)	47 350	6.1	4 353	78.2	51 703	6.7
Very low birthweight (<1500g)	7 873	1.0	3 668	65.9	11 541	1.5
Extremely low birthweight (<1000g)	3 425	0.4	3 283	59.0	6 708	0.9
All births	770 564	100.0	5 564	100.0	776 128	100.0
All births[e]	*Live births*		*Fetal deaths*		*Total births*	
Mean birthweight (grams)	3 371		1 232		3 356	
	no.	%	no.	%	no.	%
Low birthweight (<2500g)	51 141	6.4	4 672	78.5	55 813	6.9
Very low birthweight (<1500g)	8 580	1.1	3 940	66.2	12 520	1.6
Extremely low birthweight (<1000g)	3 753	0.5	3 520	59.1	7 273	0.9
All births	800 321	100.0	5 952	100.0	806 273	100.0

[a] Birthweight is collected at birth and includes stillbirths of at least 20 weeks gestation or 400g birthweight. [b] Data are presented in a three year grouping due to small numbers from year to year. [c] Indigenous data relate to babies born to Indigenous mothers only, and exclude babies born to non-Indigenous mothers and Indigenous fathers. Thus, the information is not based on the total count of Indigenous babies. [d] The denominator for the fetal death percentages is fetal deaths rather than births. [e] Includes babies to mothers of unknown Indigenous status. The number of all births is greater than the sum of births to Indigenous plus non-Indigenous mothers because births for Tasmania are included in the total births but were not available by Indigenous status for Tasmania in 2004 and so are not included in the Indigenous and non-Indigenous totals for Australia for 2004, but they were included for 2005 and 2006.

Source: AIHW National Perinatal Data Collection, National Perinatal Statistics Unit (unpublished); table 5A.3.1.

The data on Indigenous babies relate to babies born to Indigenous mothers only, as the data collection excludes babies born to non-Indigenous mothers and Indigenous fathers.

During 2004–2006:

- there were 800 321 live births in Australia, of which 96.3 per cent were babies born to non-Indigenous mothers, 3.6 per cent were babies born to Indigenous mothers and 0.1 per cent were of unknown Indigenous status (table 5.3.2)
- the mean birthweight of live births to Indigenous mothers was 3162 g, compared with 3379 g for babies born to non-Indigenous mothers — a difference of 217 g (non-Indigenous births were 6.9 per cent heavier) (table 5.3.2)

- the proportion of live births to Indigenous mothers with low birthweight was more than twice that of non-Indigenous mothers (12.9 per cent compared with 6.1 per cent). Further, the proportion of live births to Indigenous mothers with very low and extremely low birthweights (2.4 and 1.1 per cent, respectively) was higher than for babies born to non-Indigenous mothers (1.0 and 0.4 per cent, respectively) (table 5.3.2)
- of all live births, 6.4 per cent had low birthweight compared with 78.5 per cent of all fetal deaths (table 5.3.2)
- there were 5952 fetal deaths in Australia, of which 93.5 per cent were babies with non-Indigenous mothers, 5.7 per cent were births to Indigenous mothers and 0.9 per cent were of unknown Indigenous status. Fetal deaths comprised 1.2 per cent of babies to Indigenous mothers, compared with 0.7 per cent of babies born to non-Indigenous mothers (table 5.3.2)
- of those fetuses that died — for both Indigenous and non-Indigenous mothers — over half had extremely low weights (58.2 and 59.0 per cent, respectively). Furthermore, for both Indigenous and non-Indigenous mothers, around 80 per cent of fetal deaths were of low birthweight babies (81.3 and 78.2 per cent, respectively) (table 5.3.2).

Mean birthweights and proportions of low birthweight babies to Indigenous and non-Indigenous mothers remained relatively constant (with some minor fluctuations) between 1998–2000 and 2004–2006 (table 5A.3.8). Similarly, a relatively constant pattern has been reported from 1998–2000 to 2004–2006 for fetal deaths, average weights and proportions of low birthweights (table 5A.3.9).

5.4 Early childhood hospitalisations

Box 5.4.1 **Key messages**

- Hospitalisation rates for Indigenous 0–4 year olds (320.0 per 1000) were higher than those for non-Indigenous 0–4 year olds (232.0 per 1000) in 2006-07 (figure 5.4.1).
- Hospitalisation rates for both Indigenous and non-Indigenous 0–4 year olds remained relatively constant between 2004-05 and 2006-07 (figure 5.4.1).

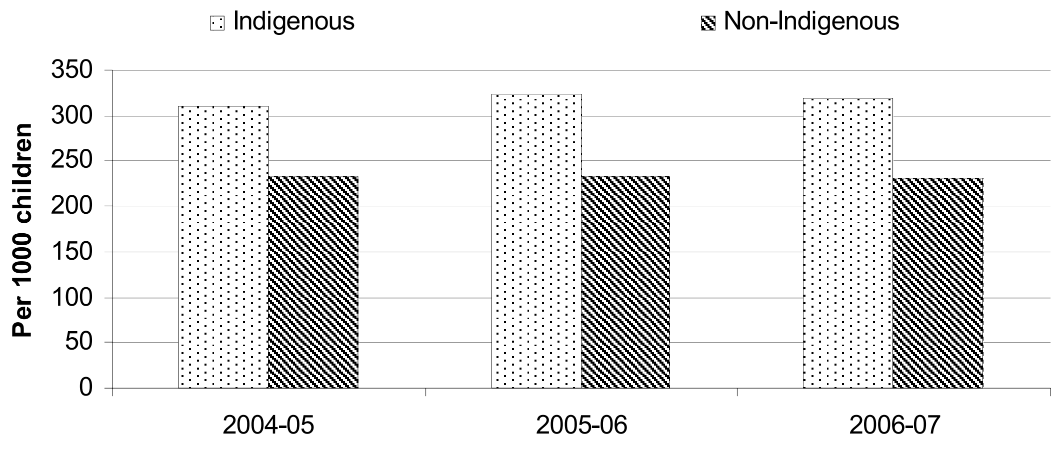
Early childhood hospitalisation rates are an indicator of the health of young children. However, they do not measure the actual prevalence of injury and disease, as many children suffering disease and injury do not require hospital treatment — most are treated by doctors, nurses and other primary health care providers outside of hospital, or do not require formal medical treatment. Hospitalisations, therefore, represent the most serious cases.

The Council of Australian Governments (COAG) National Indigenous Reform Agreement includes hospitalisation rates by principal diagnosis as an indicator of progress towards its target of 'halving the gap in mortality rates for Indigenous children under five within a decade' (COAG 2009). Data on young child mortality are included in section 4.2.

This section and the next section (5.5 Injury and preventable diseases) should be read together. This section provides a measure of the hospitalisation rate and health of young children for all health conditions, while section 5.5 provides data on a subset of hospitalisations that are potentially preventable.

This section uses data from the AIHW National Hospital Morbidity Database for NSW, Victoria, Queensland, WA, SA and public hospitals in the NT. As explained in chapter 2 and appendix 4, hospitalisation data for Indigenous people in Tasmania and the ACT are not of sufficient quality for reporting.

Figure 5.4.1 **Hospitalisations per 1000 children aged 0–4 years, NSW, Victoria, Queensland, WA, SA and public hospitals in the NT, 2004-05 to 2006-07** [a, b, c, d]

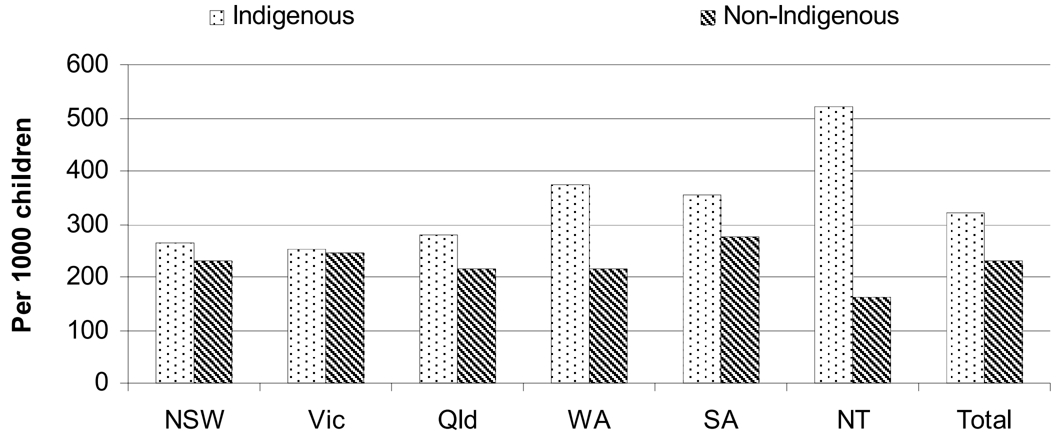


[a] Data are based on principal diagnosis as classified by the International Classification of Diseases, 10th Edition, Australian Modification (ICD-10-AM) code and description. [b] Data are based on state of usual residence. [c] Age specific rates are per 1000 people in that age group (based on ABS Indigenous population projections). [d] Hospitalisations of children for whom Indigenous status was not stated are included in the non-Indigenous numbers and rates.

Source: AIHW National Hospital Morbidity Database (unpublished); tables 5A.4.1–5A.4.3.

- Hospitalisation rates for Indigenous children aged 0–4 years (320.0 per 1000) were higher than rates for non-Indigenous children aged 0–4 years (232.0 per 1000) in 2006-07 (figure 5.4.1).
- Hospitalisation rates for both Indigenous and non-Indigenous children aged 0–4 years did not change significantly between 2004-05 and 2006-07 (figure 5.4.1).

Figure 5.4.2 **Hospitalisations per 1000 children aged 0–4 years, by State/Territory, 2006-07**[a, b, c, d]



[a] Data are based on principal diagnosis as classified by the International Classification of Diseases, 10th Edition, Australian Modification (ICD-10-AM) code and description. [b] Data are based on state of usual residence. [c] Age specific rates are per 1000 people in that age group (based on ABS Indigenous population projections). [d] Hospitalisations of children for whom Indigenous status was not stated are included in the non-Indigenous numbers and rates.

Source: AIHW National Hospital Morbidity Database (unpublished); table 5A.4.3.

- Hospitalisation rates for Indigenous children aged 0–4 years were higher than rates for non-Indigenous children aged 0–4 years in 2006-07 in all states and territories with adequate coverage of Indigenous hospitalisations, except Victoria where the rates were similar (figure 5.4.2).

Table 5.4.1 Hospitalisations of children aged 0–4 years, NSW, Victoria, Queensland, WA, SA and public hospitals in the NT, by principal diagnosis, 2006-07[a, b, c]

	No. of hospitalisations		*Age-specific rate*		
Health condition	*Indigenous*	*Non-Indigenous*[d]	*Indigenous*	*Non-Indigenous*[d]	*Rate ratio*
Diseases of the respiratory system	5 067	52 863	86.0	43.7	2.0
Conditions originating in the perinatal period	2 726	50 647	46.3	41.8	1.1
Infectious and parasitic diseases	2 674	27 002	45.4	22.3	2.0
Other symptoms, signs and abnormal findings	1 174	22 594	19.9	18.7	1.1
Contact with health services	1 056	22 047	17.9	18.2	1.0
Injury and poisoning	1 486	20 887	25.2	17.2	1.5
Diseases of the digestive system	1 056	17 114	17.9	14.1	1.3
Congenital abnormalities	689	14 943	11.7	12.3	0.9
Diseases of the ear	537	13 854	9.1	11.4	0.8
Diseases of the nervous system	310	10 922	5.3	9.0	0.6
Diseases of the genitourinary system	391	7 135	6.6	5.9	1.1
Diseases of the skin and subcutaneous tissue	926	4 533	15.7	3.7	4.2
Total hospitalisations	**18 850**	**280 947**	**320.0**	**232.0**	**1.4**

[a] Data are based on principal diagnosis as classified by the International Classification of Diseases, 10th Edition, Australian Modification (ICD-10-AM) code and description. [b] Data are based on state of usual residence. [c] Age specific rates are per 1000 people in that age group (based on ABS Indigenous population projections). [d] Hospitalisations of children for whom Indigenous status was not stated are included in the non-Indigenous numbers and rates.

Source: AIHW National Hospital Morbidity Database (unpublished); table 5A.4.3.

- The most common causes for hospitalisation of both Indigenous and non-Indigenous children aged 0–4 years in 2006-07 were respiratory diseases, conditions originating in the perinatal period, and infectious and parasitic diseases (table 5.4.1).
- Indigenous children aged 0–4 years were 4.2 times as likely as non-Indigenous children to be hospitalised for diseases of the skin and subcutaneous tissue, twice as likely to be hospitalised for respiratory diseases and infectious and parasitic diseases, and 1.5 times as likely to be hospitalised for injury and poisoning. For most other conditions, Indigenous and non-Indigenous rates were similar, (table 5.4.1).

5.5 Injury and preventable disease

Box 5.5.1 **Key messages**

- Indigenous children under five were 1.9 times as likely to be hospitalised for potentially preventable diseases and injuries as non-Indigenous children (195.4 per 1000 compared to 104.9 per 1000) in NSW, Victoria, Queensland, WA, SA and the NT combined, in 2006-07 (table 5.5.1).
- The death rate from external causes and preventable diseases for children aged less than five years was 2 to 5 times as high for Indigenous than for non-Indigenous children (3.1 to 8.6 per 10 000 compared to 1.4 to 1.7 per 10 000) in NSW, Queensland, WA, SA and the NT, during 2003–2007 (figure 5.5.2).

This indicator reports on hospitalisations and death rates attributable to injury and potentially preventable disease, with additional information on recurring infection drawn from the 2001-02 WA Aboriginal Child Health Survey.

Until the second half of the 20th century, infectious diseases were a prominent cause of death in Australia. Between 1921 and 1995, age standardised death rates from infectious diseases fell from 185 per 100 000 population to 6 per 100 000 (ABS 1997). In 2007, the death rate from certain infectious and parasitic diseases in Australia (total persons, both Indigenous and non-Indigenous) was 8.1 per 100 000 population (ABS 2009).

Infectious diseases range in severity from minor conditions such as the common cold, to serious illnesses such as meningococcal infection and tuberculosis, which can result in death. Disease is caused by organisms such as bacteria, viruses or parasites, and can be transmitted directly (for example, through droplet infection) between people, or from insects and animals to people. Disease can also be transmitted indirectly (for example, through contaminated food or water) and through the environment. Infection can also result from the pathological growth of organisms already present in a person's body (ABS 1997).

Some infections that may appear minor can have serious longer term health effects. Recurring skin and throat infections (caused by group A streptococcal bacteria) in some Aboriginal communities are associated with the highest worldwide rates of acute rheumatic fever (Currie and Carapetis 2000).[1] The major pathogen of skin

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[1] The role of group A streptococcal bacteria (in skin and throat infections) leading to acute rheumatic fever is contentious but it appears likely in Australia that it plays a role. Interventions which aim to reduce group A streptococcal throat and skin infection are likely to reduce the rate of acute rheumatic fever. The importance of acute rheumatic fever is its major complication, rheumatic heart disease. After an initial episode of acute rheumatic fever, a person is at risk of

infection, group A streptococcus, is also associated with chronic renal failure — a prevalent and highly burdensome condition among Aboriginal adults (Zubrick et al. 2004).

In Australia, many childhood diseases are generally prevented or successfully treated without hospitalisation. The main focus of this indicator is to examine the range of diseases and injuries experienced by children that result in a hospital admission, which represent the most serious cases of diseases and injury. However, there are few data on the incidence of injury and disease in young children that do not require hospitalisation. Survey data on the incidence of infectious diseases in Indigenous children in WA are included later in this section.

A wide range of social, cultural, physical and economic factors influence the health of children. Health initiatives of communities and governments can assist in the prevention of disease and promote the health of children. These initiatives include education on the benefits of good nutrition and sanitation, and the provision of adequate housing (see chapter 9 for more information on diseases associated with poor environmental health). The benefits of breastfeeding are also widely acknowledged and can reduce the risk of a range of acute childhood illnesses which may result in hospitalisation, including gastrointestinal diseases, infections, and chronic diseases such as diabetes and obesity (Queensland Health 2003).

Access to effective and appropriate health care services (including dental and immunisation services) can also influence the health of children in the short and long term. More information on immunisation rates in children and the prevalence of vaccine preventable diseases as well as access to primary health care in general, is included in section 7.1. Section 5.7 includes information on ear infections in children and section 7.6 covers tooth decay in children (and adults).

Box 5.5.2 describes programs to reduce rates of preventable disease for Indigenous people.

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recurrent episodes, each of which can increase the risk of rheumatic heart disease. Rheumatic heart disease is caused by the damage done to the heart muscle or heart valves during an episode of acute rheumatic fever (ABS and AIHW 2008; Online Medical Dictionary 2005). Acute rheumatic fever and rheumatic heart disease are now rare in populations with good living conditions — optimal hygiene and minimal household overcrowding — and easy access to quality medical care (things that Indigenous people often lack).

Box 5.5.2 **'Things that work' — Injury and preventable disease**

The **Nganampa Health Council**, SA, provides primary healthcare services for the Anangu people of SA. Nganampa Health operates nine clinics with more than 120 staff, the majority being Anangu residents. Programs in the region relate to health worker training, substance abuse prevention, and sexual, environmental, dental, women's, men's and children's health programs. The primary health care service and related programs have had positive outcomes on the health of the community, including in 2005:

- infant birthweight had increased
- screening coverage for HIV and sexually transmitted infections was the most thorough to date
- 99 per cent of children under five, 89 per cent of 6–14 year olds and 77 per cent of 15–19 year olds had been immunised for Meningococcal C by August 2005 (Oxfam Australia 2007).

The **Jalaris Health Outreach service** provides public health services and programs to Aboriginal families in Derby, WA, targeting marginalised families disengaged from services. Early intervention, engagement and education of families and awareness of nutrition and preventable diseases are all key aspects of the corporation's work. The Jalaris Health Outreach service operates in collaboration with health practitioners engaging with the families of children involved in the Kids Futures Club (also provided by Jalaris Aboriginal Corporation). The Outreach service visits households at least twice a year providing health support, information and access to mobile clinics. A variety of programs have been implemented including:

- a nutrition program providing nutritious meals to children of parents who are heavy alcohol users
- the Building Stronger Families in Derby project, involving homemaking and environmental health education for families.

Evaluation of the Jalaris programs has shown that they have had positive impacts on health and have increased the interactions with mainstream health services (AMA 2008; PHAA 2008).

The **East Arnhem Healthy Skin project** was a three-year project completed in August 2007. The project aimed to reduce the prevalence of scabies, skin sores and tinea in five East Arnhem communities in the NT. Through a combination of community treatment days, routine screening at health clinics and home visits, the skin sore burden among children in these communities almost halved — from 46 to 28 per cent of the children seen (Cooperative Research Centre for Aboriginal Health 2008).

The conditions included in table 5.5.1 are based on AIHW advice and include conditions that could have potentially been prevented by the provision of appropriate non-hospital health services, as well as injuries that could potentially have been prevented (usually outside the health system in broader society). Some of the disease codes included may also include some non-preventable conditions.

Table 5.5.1 Potentially preventable hospitalisations for children aged less than 5 years, NSW, Victoria, Queensland, WA, SA, and public hospitals in the NT, 2006-07[a, b, c]

	Hospitalisations (number)			*Age specific rate (per 1000 population)*	
ICD-10-AM code and description	*Indigenous*	*Non-Indigenous*[d]	*Total*	*Indigenous*	*Non-Indigenous*[d]
Certain infectious and parasitic diseases (A00–B99)	2 674	27 002	29 676	45.4	22.3
Nutritional anaemias (D50–D53) and malnutrition (E40–E46)	100	119	219	1.7	0.1
Diseases of the ear and mastoid process (H60–H95)	562	14 144	14 706	9.5	11.7
Diseases of the respiratory system (J00–J99)	5 067	52 863	57 930	86.0	43.7
Diseases of oral cavity, salivary glands and jaws (K00–K14)	699	7 493	8 192	11.9	6.2
Diseases of the skin and subcutaneous tissue (L00–L99)	926	4 533	5 459	15.7	3.7
Injury, poisoning and certain other consequences of external causes (S00–T98)[e]	1486	20 887	22 373	25.2	17.2
Transport accidents (V01–V99)[e]	84	875	959	1.4	0.7
Other external causes of accidental injury (W00–X59)[e]	1222	18 107	19 329	20.7	15.0
Assault (X85–Y09)	94	224	318	1.6	0.2
Complications of medical and surgical care (Y40–Y84)[e]	70	1 588	1 658	1.2	1.3
Other[e]	16	93	109	0.3	0.1
Total potentially preventable hospitalisations	**11 514**	**127 041**	**138 555**	**195.4**	**104.9**

[a] Data are based on principal diagnosis as classified by the International Classification of Diseases-10th Edition-Australian Modification code and description. [b] Data are based on state of usual residence. [c] Age specific rates are per 1000 people in that age group (based on ABS Indigenous population projections). [d] Hospitalisations where Indigenous status was not stated are included in the non-Indigenous numbers and rates. [e] External causes sub-categories classified by first external cause.

Source: AIHW National Hospital Morbidity Database (unpublished); table 5A.5.1.

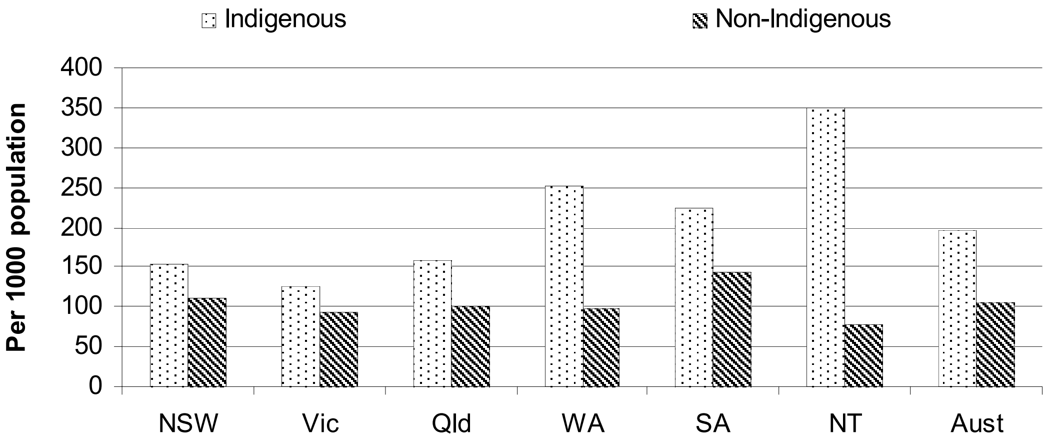
In NSW, Victoria, Queensland, WA, SA and public hospitals in the NT in 2006-07:

- Indigenous children aged less than five years were 1.9 times as likely to be hospitalised for potentially preventable diseases and injuries than non-Indigenous children (195.4 per 1000 compared to 104.9 per 1000) (table 5.5.1).
- diseases of the respiratory system were the most common cause of potentially preventable hospitalisations for both Indigenous and non-Indigenous children aged less than five years, but the rate for Indigenous children (86.0 per 1000) was twice as high as the rate for non-Indigenous children (43.7 per 1000) (table 5.5.1).

- certain infectious and parasitic diseases was the second most common cause of potentially preventable hospitalisations for both Indigenous (45.4 per 1000) and non-Indigenous (22.3 per 1000) children aged less than five years of age.

Data on hospitalisations of children aged less than five years for potentially preventable diseases and injuries remained relatively constant throughout the period 2004-05 to 2006-07 for both Indigenous and non-Indigenous populations (tables 5A.5.1–5A.5.3).

Figure 5.5.1 **Potentially preventable hospitalisations for children aged less than five years, 2006-07[a, b, c, d]**



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[a] Data are based on principal diagnosis as classified by the ICD-10-AM code and description. [b] Data are based on state of usual residence. [c] Age specific rates are per 1000 people in that age group (based on ABS Indigenous population projections). [d] Hospitalisations where Indigenous status was not stated are included in the non-Indigenous numbers and rates.

Source: AIHW National Hospital Morbidity Database (unpublished); table 5A.5.1.

- In NSW, Victoria, Queensland, WA, SA and the NT combined, Indigenous children under five were 1.9 times more likely to be hospitalised for potentially preventable diseases and injuries than non-Indigenous children (195.4 per 1000 compared to 104.9 per 1000) in 2006-07 (table 5A.5.1).
- Hospitalisations rates for potentially preventable diseases and injuries were higher for Indigenous than non-Indigenous children aged less than five years in 2006-07 for each of the six states and territories for which data are available (figure 5.5.1).

The WA Aboriginal Child Health Survey (Zubrik et al. 2004) collected information in 2001 and 2002 on recurring infections — these conditions did not necessarily result in hospitalisation.

- Recurring chest infections affected 12.3 per cent of Indigenous children aged 0–17 years, with infection rates highest for children aged 0–3 years and lowest for children aged 12–17 years. There was no association between infection rates and levels of relative isolation.[2]
- An estimated 8.5 per cent of Indigenous children had recurring skin infections such as school sores or scabies. Children aged 4–11 years were the most likely to have recurring skin infections. The prevalence was 17.6 per cent in extremely isolated areas, more than twice the rate in all other areas.
- An estimated 5.6 per cent of Indigenous children suffered from recurring gastrointestinal infections, with infection rates twice as high in extremely isolated areas as in other areas. Prevalence decreased significantly after 12 years of age.
- Some 18.1 per cent of Indigenous children had recurring ear infections. Older children aged 12–17 years were significantly less likely to have recurring ear infections (13.6 per cent) than children aged 0–3 years (20.4 per cent) and children aged 4–11 years (19.9 per cent).
- An estimated 9.7 per cent of Indigenous children reported more than one of recurring chest, skin, gastrointestinal and/or ear infections, with 6.9 per cent suffering from two types, 2.3 per cent suffering from three types and 0.5 per cent suffering from all four types. Significantly more children in areas of extreme isolation (17.9 per cent) had more than one type of recurring infection than children in less isolated areas.
- An estimated 16.3 per cent of children in households where their primary carer reported financial strain suffered from more than one type of recurring infection, which was significantly higher than the prevalence in households where the primary carer could 'save a bit now and again' (8.4 per cent) or could 'save a lot' (7.2 per cent). There was no association between the primary carer's educational attainment and either recurring infections or ear infections in children under their care.

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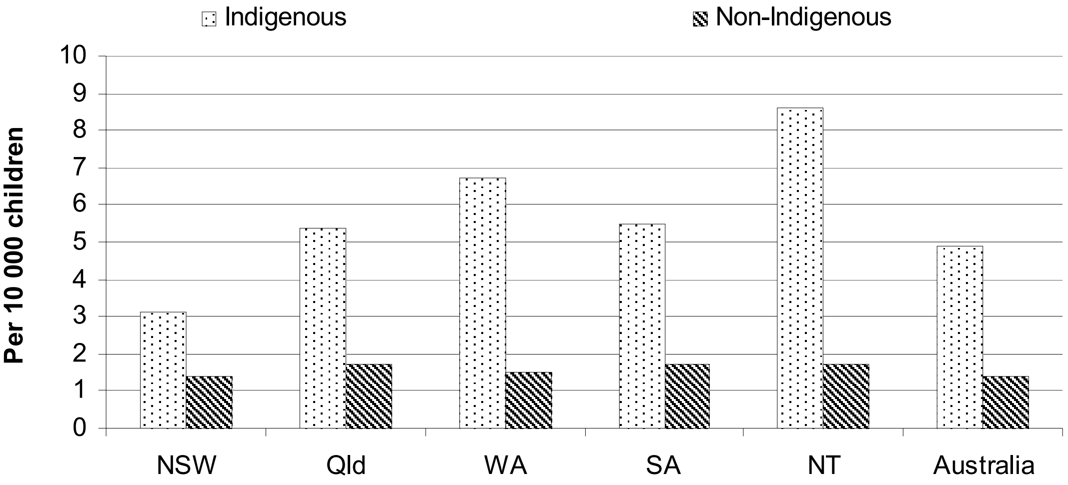
[2] Zubrick et al. (2004) used a different series of geographic region (remoteness) categories than the standard ABS categories used elsewhere in this report and discussed in chapter 2. Both sets of categories are based on the Accessibility Remoteness Index of Australia (ARIA). The ABS categories are a widely used version known as ARIA+, whereas the version used by Zubrick et al. (2004) is known as ARIA++, which has been designed to allow greater distinction between locations that are all classified as very remote in the ABS ARIA+ version. The five ARIA++ categories used by Zubrick et al. (2004) are called levels of relative isolation and comprise the categories: none (Perth metropolitan area), low, moderate, high and extreme.

Figure 5.5.2 **Deaths rates from external causes and preventable diseases for children aged less than five years, 2003–2007[a, b, c]**



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[a] Data on deaths of Indigenous people are affected by different levels of coverage of deaths identified as Indigenous across states and territories. Care should be exercised in analysing these data, particularly in making comparisons across states and territories between Indigenous and non-Indigenous data. [b] Denominators used in calculations of rates for the Indigenous population are Experimental Estimates and Projections, Aboriginal and Torres Strait Islander Australians (low series, 2001 base). There are no comparable data for the non-Indigenous population. Denominators used in the calculation of rates for comparison with the Indigenous population have been derived by subtracting Indigenous population estimates/projections from total estimated resident population and should be used with care, as these data include population units for which Indigenous status was not stated. [c] Non-Indigenous includes deaths with 'not stated' Indigenous status.

Source: ABS *Causes of Death, Australia,* Cat. no. 3303.0 (unpublished); table 5A.5.4.

- During 2003–2007, the death rate from external causes and preventable diseases for children aged less than five years was 2 to 5 times higher for Indigenous (from 3.1 to 8.6 per 10 000 children) than non-Indigenous (from 1.4 to 1.7 per 10 000 population) people for NSW, Queensland, WA, SA and the NT (the jurisdictions for which data were available) (figure 5.5.2).

5.6 Basic skills for life and learning

Box 5.6.1 **Key messages**

- 67.3 per 1000 Indigenous children aged 0–14 years received a Medicare funded voluntary heath check/assessment in 2007–08 (table 5.6.1).
- The Australian Early Development Index is being implemented in 2009 and will provide information on Indigenous children at a State and national level.

This indicator focuses on the developmental health and learning of children before they enter primary school. It contains two measures:

- children with developmental health checks at 6, 12 and 18 months, and at 4 years
- Australian Early Development Index (AEDI).

Data for these two measures are currently either very limited or unavailable. However, some data are available on health checks for Indigenous children aged 0–4 years.

Box 5.6.2 provides an example of a project aimed at improving life opportunities for Aboriginal children aged 0–4 years.

Box 5.6.2 **Things that work— Basic skills for life and learning**

Best Start is a WA Department for Communities program that aims to improve life opportunities for Aboriginal children aged from 0–5 years, with co-operation from health, welfare and Indigenous agencies. Several factors differentiate this program from other 'supported playgroup' models. Improving school readiness through play based activities is a key objective, but the program starts from birth and transitions through to school enrolment. Parents and carers (including fathers) must attend, and are an integral part of all activities. Support and referrals are also provided to 'at risk' and/or socially isolated families experiencing family violence, addiction, accommodation or legal problems.

There are three metropolitan and ten regional/remote services operating across WA, and in 2009 there were 14 new community requests for the program. Two examples are:

- Moora has a population of 2410, and 16.6 per cent of children aged 0–4 years are Indigenous. Best Start engages local Indigenous families through a group activity program for babies, toddlers and preschoolers that runs three days per week at a local resource centre. Feedback from local schools is very positive about the school readiness and confidence levels of Best Start graduates, and anecdotal evidence shows increased attendance and successful participation in early education.
- Armadale is a large inner city Perth suburb, where 5.5 per cent of children aged 0–4 years are Indigenous. Best Start operates as an outreach program providing family support, advocacy, playgroups, parenting and cultural activities. Playgroups are located in several school and community venues which broadens access. Parents, especially young mothers, support Best Start because of the support and nurturing they receive from the program. Close partnerships with non-Indigenous service providers broaden family access to services and networks (WA Department for Communities, unpublished).

(Continued next page)

Box 5.6.2 (continued)

The **Welcome Baby to Country project** (Vic) is based on the Aboriginal tradition of 'Tandurrum', a ceremony performed by traditional owners to welcome other visiting Aboriginal people entering traditional lands. The project facilitates a positive engagement of traditional owners and the broader Aboriginal community to celebrate the birth of Indigenous babies in the Wimmera/Mallee region.

This project has focused attention on children's needs and achievements and acknowledge the role of parents, carers and families in their growth and development. It has also been successful in increasing the engagement of relevant support services with Indigenous parents, carers and families and in providing an opportunity to supply information, resources and assistance to Indigenous parents and families. The project won the 2008 Minister for Children and Early Childhood Development Early Years Award. (Victorian Government unpublished).

Developmental health checks

The Australian Government has introduced a number of new Indigenous health checks and health assessments within the Medicare Benefits Schedule (MBS) to improve early intervention and diagnosis for treatable conditions. The MBS provides items for regular health checks or assessments for Aboriginal and Torres Strait Islander people of various ages.

The Aboriginal and Torres Strait Islander Health Checks are categorised into three age groups:

- Child Health Check, MBS item number 708, for people aged 0–14 years
- Adult Health Check, MBS item number 710, for people aged 15–54 years
- Older Person's Health Check, MBS item numbers 704 and 706, for people at least 55 years of age.

In addition, Indigenous people may receive health checks available to all people:

- Four year old Child Health Check, MBS item numbers 709 and 711, for a child receiving or who received four year old immunisations
- Older Person's Health Check, MBS item numbers 700 and 702, for people age 75 years and over
- Health Checks for people in their forties at risk of type 2 diabetes or chronic disease, MBS item numbers 71 and 717.

Medicare Australia collects data and reports on the use of MBS item numbers. Data for this indicator are only available for the Indigenous Child Health Check, MBS item number 708 (table 5.6.1). Child health checks for four year old children (MBS item numbers 709 and 711) were only introduced in 2008 and reliable data are not yet available.

Table 5.6.1 illustrates that in 2007–08:

- 67.3 per 1000 Indigenous children aged 0–14 years received a voluntary heath check/assessment under MBS item number 708
- the NT had the highest and Tasmania had the lowest rates of health checks for Indigenous children aged 0–14 years.

The Northern Territory Emergency Response (NTER) announced by the former Australian Government on 21 June 2007 introduced a Child Health Check (CHC) program. Indigenous children aged 15 years or less who live in the prescribed areas of the Northern Territory are eligible for a NTER CHC. The CHC data collection contains information on:

- the child's medical history
- the family medical history
- the child's housing situation
- health status at the time of the health check.

These checks were undertaken from mid-July 2007 and data collection relating to these checks continued until 30 June 2009. The NTER CHC are based on the MBS item number 708, which covers health checks for children and can be claimed every nine months. As at 17 October 2008, an estimated 12 263 CHCs had been performed in the NT through the NTER and MBS item 708 health checks since mid July 2007 (AIHW 2008b). Some but not all NTER CHCs were the subject of the MBS Item 708 claims. Duplicates have been removed from the above estimate.

Many babies and young children receive regular developmental health checks from maternal and child health nurses. These services are often provided by State and Territory or local governments. While no data currently exist for health checks conducted by maternal and child health nurses, many jurisdictions are intending to commence such collections.

Table 5.6.1 **Indigenous children aged 0–14 years who received a voluntary health check or assessment, 2007–08**[a, b]

	Unit	*NSW*	*Vic*	*Qld*	*WA*	*SA*	*Tas*	*ACT*	*NT*	*Aust* [b]
Child health checks (0–14 years)[c]										
Number of health checks conducted	no.	2 561	264	3 341	1 823	300	4	39	4 065	12 397
Target population	no.	54 652	10 879	53 077	26 112	9 975	6 844	1 648	20 814	184 076
Health checks per 1000 children	no.	46.9	24.3	62.9	69.8	30.1	0.6	23.7	195.3	67.3

a Excludes services that qualify under the Department of Veterans' Affairs National Treatment Account and services provided in public hospitals. **b** Includes other territories. **c** Health checks under MBS item number 708.

Source: Medicare Australia (unpublished), derived from Medicare Benefits Schedule Item Statistics Reports, available: http://www.medicareaustralia.gov.au/statistics/dyn_mbs/forms/mbs_tab4.shtml (accessed 9 October 2008); ABS (2004), Experimental Estimates and Projections, Aboriginal and Torres Strait Islander Australians, Cat. no. 3238.0.

WA provides a universal maternal and child health service that offers health and developmental screening and surveillance for children 0–4 years. The service has introduced Parents Evaluation of Developmental Status (PEDS) as a developmental screening tool, offered at the 3–4 month, 8 month, 18 month and 3 years health checks. In WA, community health client data are collected for both individual and group contacts, but do not allow for individual client tracking or the ability to identify if a developmental screening was offered. Tasmania is intending to start collecting health check data for children at 12 months.

Australian Early Development Index (AEDI)

The importance of improving education outcomes for children has attracted significant international interest and is recognised as crucial in building resilience and improving outcomes across the life-span (AIHW 2008a).

The AEDI is a population measure of children's development as they enter full time school. The AEDI assists communities to understand the development of local children compared to other children nationally. The AEDI highlights the strengths of community resources and services and identifies how they could be improved. The AEDI is measured by a checklist completed for each child by their teacher. The checklist consists of over 100 questions in the developmental areas of:

- physical health and well being
- social competence
- emotional maturity
- language and cognitive skills
- communication skills and general knowledge.

Between 2004 and 2007, 60 geographic areas across all Australia , except for NT, have been involved in testing the AEDI. Within these communities, 2157 teachers from 1012 schools, government and non-government, completed the AEDI checklist for 37 420 children in the first year of full time school (RCH 2008b).

The AEDI will be implemented nationally in 2009 and will be able to provide data on Indigenous children both at a state and national level.

The AEDI Indigenous Adaptation Study was initiated to ensure the AEDI is relevant and sensitive to the needs of Indigenous children. Adaptations arising from the study include:

- modifications to the AEDI Guide for Teachers so that particular cultural considerations could be taken into account on certain checklist items
- teachers complete the AEDI Checklists for Indigenous children collaboratively with an Indigenous cultural consultant (where available); and
- additional checklist questions to provide contextual information to aid in interpreting the AEDI results

WA participated in a trail of these adaptation in 2008. The checklists were completed by teachers and, where available, Aboriginal and Islander Education Workers (AIEW). The trial involved 49 schools from the Armadale, Carnarvon and Meekatharra (Gascoyne/Murchison/Midwest) and Pilbara regions and checklists were completed for 568 Indigenous children in those participating schools (RCH 2008d).

In the Northern Territory, the second phase of the Adaptation study has commenced with commitment from the NT Government to continue trialling the community engagement and mobilisation activities in 2009 (RCH 2008d)

The 2009 AEDI data collection will evaluate the additional questions developed through the Adaption study as part of the standard AEDI checklist.

5.7 Hearing impediments

Box 5.7.1 **Key message**

- Despite strong evidence of the high prevalence rates for hearing impediments in Indigenous children, particularly in remote areas, the hospitalisation rate for middle ear and mastoid disease for Indigenous 0–3 year olds (8.9 per 1000) was below that for non-Indigenous 0–3 year olds (9.7 per 1000) in 2006-07 (table 5.7.1).

The most common causes of hearing loss among Indigenous people are disorders of the middle ear. Otitis media, which is an inflammation of the middle ear, is a common childhood disease and often occurs as a result of another illness (such as a cold), caused by bacterial and viral infections (Burrow and Thomson 2006; Morris et al. 2005; Couzos, Metcalf and Murray 2001). There are various forms of otitis media. Generally accepted definitions can be found in Burrow and Thomson (2006) and box 5.4.2 of SCRGSP (2007).

Otitis media in non-Indigenous children typically resolves with age and is rarely seen amongst non-Indigenous children over the age of eight (Burrow and

Thompson 2003). In contrast, Indigenous children living in remote communities have the highest internationally published prevalence rates for otitis media (Morris et al. 2006).

Studies spanning 30 years have consistently found that, in Indigenous children, otitis media typically starts at a younger age, is much more common and is more likely to result in hearing loss than in non-Indigenous children (Boswell and Nienhuys 1996; Couzos, Metcalf and Murray 1999; Leach et al. 1994; Lehmann et al. 2003; Moran et al. 1979; Morris et al. 2005). More recently, a study by a paediatric outreach service in far north Queensland identified chronic suppurative otitis media as the most prevalent health problem in Aboriginal children (Rothstein, Heazlewood and Fraser 2007).

The impact of hearing loss, due to otitis media, on the quality of life of Indigenous children and their caregivers is well documented (Brouwer et al. 2005; Howard and Hampton 2006; Nienhuys 1992; Thorne 2004; Zubrick et al. 2004). Indigenous children under three are at the highest risk of ear disease. Unfortunately, this is also the most critical development period for speech and language development, underpinning communication, learning, and social and emotional development (Brouwer et al. 2005; Nienhuys 1992; Zubrick et al. 2004).

Identifying risk factors for otitis media will inform the development of early prevention and intervention strategies. Risk factors for otitis media are outlined below.

- There is relatively higher bacterial colonisation in Indigenous infants, which is strongly correlated with the onset of middle ear effusion (this tended to occur within the first 12 weeks of life in 66 per cent of Indigenous infants). No corresponding correlation is found between colonisation and the onset of otitis media in non-Indigenous infants. Further, once the bacterial colonisation is established, Indigenous infants are significantly less likely than non-Indigenous infants to clear the bacterial pathogens (Morris et al. 2006; Smith-Vaughan et al. 2008). Early bacterial colonisation in Indigenous infants is exacerbated by overcrowded living conditions, poor hygiene and insanitary living conditions (Smith-Vaughan et al. 2008).
- Some studies have found a link between the early first onset of otitis media and the increased risk of recurrent infections (that is, ‘early and often’ appears to be the rule). Indigenous infants tend to have persistent acute otitis media and other ear infections that are rarely resolved (Boswell and Nienhuys 1996; Morris et al. 2006).
- The incidence of acute otitis media in other family members may significantly increase the risk of ear infection, especially in children.

- Although few studies have evaluated this relationship, malnutrition in Indigenous children may be associated with the development of chronic otitis media (Jones and Smith 2006).
- Passive smoking can increase the risk of ear infections (Di Franza and Lew 1996; Jacoby et al. 2008). By limiting exposure to tobacco smoke, it is estimated that ear infections would drop by 27 per cent in Aboriginal children and 16 per cent in non-Aboriginal children (Jacoby et al. 2008). Section 7.4 discusses the high rates of smoking within the Indigenous population.

To a large extent, otitis media is preventable and treatable either through surgery or a long-term course of antibiotics. A surgical procedure (myringotomy) can be performed to assist in restoring hearing. This is achieved by releasing the fluid that builds up in the middle ear (NSW DoH 2002). A randomised control trial of at risk Aboriginal infants found that infants receiving long-term antibiotics (antibiotics for 24 weeks) had more normal ears, fewer perforations and less bacterial colonisation (Leach et al. 2008).

Box 5.7.2 provides examples of programs that have improved hearing outcomes for Indigenous children.

Box 5.7.2 **'Things that work' — improving hearing outcomes**

'Can't hear? Hard to Learn' is an education and screening program for otitis media in Aboriginal children. The program operates across Eurobodalla, Bega Valley, Monaro and Southern Tablelands Health Clusters in NSW. The program is achieving results and is improving hearing and communication in Aboriginal children (ARCHI 2008).

Evaluation of the program revealed otitis media screening targets were exceeded in 2005-06 (93 per cent of eligible children were screened). The evaluation identified positive clinical outcomes, including:

- improved access of Aboriginal children to specialist services through addressing and reducing barriers
- a culturally appropriate health service for Aboriginal children
- improved access to early intervention and early treatment for ear disease
- improved hearing and learning for children
- improved health status of children (ARCHI 2008).

(Continued next page)

Box 5.7.2 (continued)

Swimming pools in remote communities have improved child health outcomes. Previous reports (2005 and 2007) presented outcomes in WA of a study into the health benefits of a swimming pool in the WA Burringurrah Aboriginal community (Lehmann et al. 2003; TICHR 2006). The study compared the heath status of children before and after the swimming pool was opened, and found that there was a reduced prevalence of skin infections and reduced rates of ear disease (TICHR 2006).

Silva et al. (2008) examined the impact of swimming pools on rates of skin, ear and chest infections in two remote WA Aboriginal communities, Jigalong and Mugarinya. After examining seven years of clinical records in the two communities, Silva et al. found that infections were more than halved in both communities. Clinic attendance rates for skin infections fell by 68 per cent in Jigalong and by up to 77 per cent in Mugarinya. In Jigalong, prescriptions for antibiotics fell by 45 per cent, clinic attendance for middle-ear infections dropped by 61 per cent and attendance for chest infections was halved (Silva et al. 2008).

An ear health program in Leonora (WA) has been successful in teaching people how to keep the ear canals clean and people who learned this as children are now teaching their own children. Many of the Aboriginal students in the local school had runny infected ear discharge. An Aboriginal health worker since 1983, Geraldine Hogarth, realised that children with this problem needed their ears syringed up to 4 times a day. She visited school and homes regularly to do this making sure parents, teachers and caregivers were educated about ear health. (Department of Indigenous Affairs (Western Australia) 2007). Geraldine's program was recognised in the 2007 National Excellence Awards in Aboriginal and Torres Strait Islander Health Awards.

The 2007 report included a study by the **Education Queensland Indigenous Schooling Support Unit** (previously called the Townsville Learning and Engagement Centre). The study found that 44.8 per cent of year 2 students in a local Townsville primary school had possible conductive hearing loss (a high proportion of the students assessed were Indigenous). The Indigenous Schooling Support Unit developed in-class hearing assessment tools for teaching staff, hearing assessment games for parents and professional development for both teachers and parents to identify any hearing loss. These strategies have been successful in early identification of students with conductive hearing loss. Early identification of hearing problems has meant students receive educational support and referral for treatment as soon as possible. Teachers also noted that addressing hearing loss issues often improved behavioural issues. One teacher commented 'Now that I understand why this child behaves this way I can put strategies in place to support the student' (Queensland Government unpublished).

Data on hearing loss

The Northern Territory Emergency Response (NTER) announced by the former Australian Government on 21 June 2007 introduced a Child Health Check (CHC) initiative. Indigenous children aged 15 years or less who live in the prescribed areas of the NT are eligible for a NTER CHC. These checks were undertaken from mid-July 2007 and data collection relating to these checks continued until 30 June 2009. A progress report on the findings on health conditions identified during CHC found that middle ear disease was common in NT Indigenous children. Almost 30 per cent of Indigenous children aged 0 to 15 years were diagnosed with ear disease (AIHW and Department of Health and Ageing 2008).

Ear and hearing problems are often treated by general practitioners. Data on general practitioner encounters for ear and hearing problems are available from the Bettering the Evaluation and Care of Health survey. For the 5 year period, 2002-03 to 2006-07, there was no statistically significant difference between rates of ear and hearing problems managed by a GP for Indigenous and non-Indigenous children aged 0–14 years (13.1 per 100 encounters compared with 10.8 per 100 encounters, respectively) (AIHW 2008).

The Australian Health Ministers' Advisory Council (2006) identified children's hearing loss as a health issue that needs improvement. Children's hearing loss is a performance measure in the Aboriginal and Torres Strait Islander Health Performance Framework (ATSIHPF) (AHMAC 2008). The ATSIHPF reported on hospitalisations for tympanoplasty. Tympanoplasty is reconstructive surgery for a perforated eardrum due to middle ear infection. Over the period July 2004 to June 2006, Indigenous children aged 0–14 years were hospitalised for tympanoplasty procedures at almost four times the rate of other children (AIHW 2008). Previously (between July 2002 and June 2004), Indigenous children were hospitalised for tympanoplasty procedures at a rate five times as high as other children (AHMAC 2006).

Data on the prevalence of hearing conditions in Indigenous children are limited. At a national level, surveys in 2001 and 2004-05 reported much higher prevalence of hearing conditions, including total/partial hearing loss and otitis media, in Indigenous children compared with non-Indigenous children (tables 5A.7.1 and 5A.7.2). In 2004-05, rates of otitis media were four times as high among Indigenous children aged 0–14 years as non-Indigenous children in this age group (table 5A.7.5). Data on long term hearing problems in Indigenous and non-Indigenous people, by remoteness, are shown in tables 5A.7.3 and 5A.7.4.

Data presented below are ear or hearing problems that resulted in admission to a hospital for NSW, Victoria, Queensland, WA, SA and public hospitals in the NT.

Table 5.7.1 **Age specific hospitalisations (per 1000) where the principal diagnosis was diseases of the ear and mastoid process, NSW, Victoria, Queensland, WA, SA and public hospitals in the NT**[a, b, c]

Principal diagnosis	*Indigenous*			*Non-Indigenous* [c]		
	2004-05	*2005-06*	*2006-07*	*2004-05*	*2005-06*	*2006-07*
People aged 0–3 years						
Diseases of external ear	0.5	0.3	0.5	0.3	0.2	0.2
Diseases of middle ear and mastoid	8.7	7.9	8.9	12.7	10.9	9.7
Suppurative and unspecified otitis media	4.7	4.4	4.5	4.0	3.4	3.1
Diseases of inner ear	–	np	np	–	–	–
Other disorders of ear	0.5	0.5	0.4	0.8	0.7	0.6
People aged 4–14 years						
Diseases of external ear	0.3	0.3	0.2	0.2	0.2	0.2
Diseases of middle ear and mastoid	6.2	6.3	5.9	5.1	4.9	5.3
Suppurative and unspecified otitis media	1.5	1.5	1.2	1.0	1.0	1.1
Diseases of inner ear	–	np	np	–	–	–
Other disorders of ear	0.2	0.3	0.3	0.2	0.2	0.2

[a] Hospitalisation is the discharge, transfer, death or change of episode of care of an admitted patient (see glossary for a detailed definition) [b] Data are based on state of usual residence. [c] Includes hospitalisations where Indigenous status was not reported. – Nil or rounded to zero. **np** Not published.

Source: AIHW National Hospital Morbidity Database (unpublished); tables 5A.7.12 to 5A.7.14.

Hospitalisations data only include those who have accessed medical services, and have been diagnosed and admitted to hospital for the specified conditions. Cases that result in a visit to a general practitioner or to an emergency department, but do not lead to hospitalisation, are excluded. There may also be a large share of 0–3 year olds where parents may not be aware that their children have an ear or hearing problem or where access to hospitals may be limited.

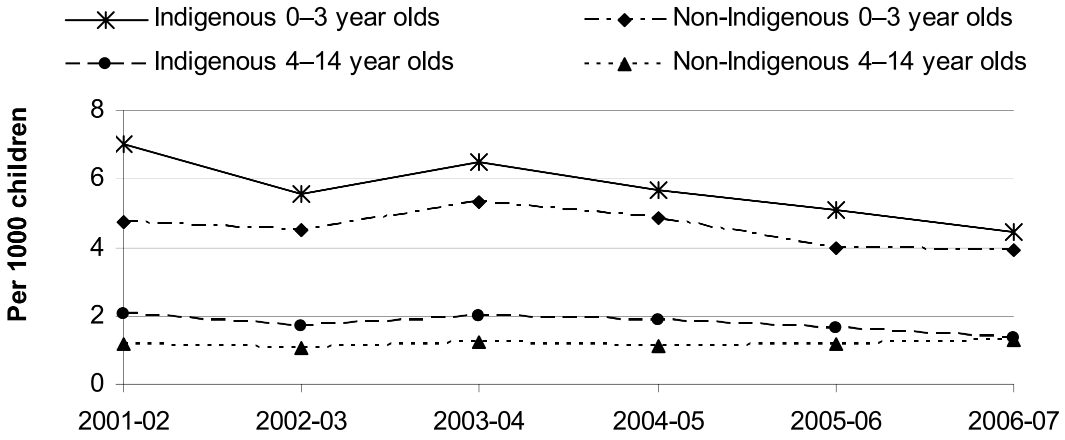
Hospitalisation data used in this section are for six jurisdictions: NSW, Victoria, Queensland, WA, SA, and the NT. These data have sufficient levels of Indigenous identification for three years (from 2004-05 to 2006-07). Table 5.7.1 shows that over this period:

- the most common principal diagnosis (for both populations and age groups) was for diseases of the middle ear and mastoid
- the Indigenous 0–3 year olds hospitalisation rate for middle ear and mastoid disease remained relatively unchanged (8.7 per 1000 to 8.9 per 1000). However, the hospitalisation rate for non-Indigenous 0–3 year olds decreased from 12.7 per 1000 in 2004-05 to 9.7 per 1000 in 2006-07.

In 2006-07:

- Indigenous children up to and including the age of three years had a higher hospitalisation rate for suppurative and unspecified otitis media than non-Indigenous children (4.5 per 1000 compared with 3.1 per 1000) but a lower rate of hospitalisation than non-Indigenous children for all diseases of the middle ear and mastoid (table 5.7.1)
- for both Indigenous and non-Indigenous children, the hospitalisation rate for suppurative and unspecified otitis media for children aged 0–3 was higher than the hospitalisation rate for children 4–14 years (table 5.7.1).

Figure 5.7.1 **Age specific hospitalisations (per 1000) where the principal diagnosis was suppurative and unspecified otitis media, Qld, WA, SA and public hospitals in NT[a, b, c, d]**



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[a] Hospitalisation is the discharge, transfer, death or change of episode of care of an admitted patient (see glossary for a detailed definition). [b] Data are based on state of usual residence. [c] Identification of Indigenous patients is incomplete and completeness varies across jurisdictions. [d] Non-Indigenous includes hospitalisations where Indigenous status was not reported.

Source: AIHW National Hospital Morbidity Database (unpublished); tables 5A.7.6 to 5A.7.11.

Longer time series data on hospitalisation rates for suppurative and unspecified otitis media for Queensland, WA, SA and the NT from 2001-02 to 2006-07 are presented in figure 5.7.1. Hospitalisation rates for these jurisdictions for other diseases of the ear and mastoid can be found in tables 5A.7.6–11.

From 2001-02 to 2006-07, for the four jurisdictions:

- the hospitalisation rate for suppurative and unspecified otitis media fluctuated for both Indigenous and non-Indigenous children aged 0–3 years old
- the hospitalisation rate for suppurative and unspecified otitis media decreased for both Indigenous children (from 7.0 per 1000 to 4.5 per 1000) and non-Indigenous children (from 4.8 per 1000 to 3.9 per 1000) aged 0–3 years old (tables 5A.7.6 to 5A.7.11)
- the hospitalisation rate for suppurative and unspecified otitis media decreased slightly for Indigenous 4–14 year olds (from 2.0 per 1000 in 2001-02 to 1.3 per 1000 in 2006-07), while the non-Indigenous rate remained stable (tables 5A.7.6–11).
- hospitalisation rates for other diseases of the ear and mastoid followed a similar trend to rates for suppurative and unspecified otitis media (tables 5A.7.6–11).

5.8 Future directions in data

Maternal health

Data on attendance at antenatal care sessions are available only for NSW, Queensland, SA and the NT, and, there are comparability issues with some NSW data. (Some data were available for the ACT in previous years.) A nationally consistent collection of data on attendance at antenatal care sessions by Indigenous status for all jurisdictions would be valuable. Data on the number of mothers attending at least five antenatal care sessions and the number attending their first session in the first trimester of pregnancy are particularly relevant to improving health outcomes for Indigenous babies. Data on attendance at antenatal sessions by age of mother may also be useful and may provide a link to outcomes for teenage mothers (section 5.2).

Data on smoking during pregnancy are available for all jurisdictions except Victoria. There is a lack of data on alcohol consumption during pregnancy and on FAS/FASD (although some are available for north Queensland).

It is anticipated that the 2008 ABS National Aboriginal and Torres Strait Islander Social Survey (NATSISS) will improve the availability of information on use of tobacco, alcohol and illicit substances during pregnancy nationally and, where possible, for each jurisdiction. The likelihood of obtaining robust data for Victoria has been improved by the Victorian Government’s collaboration with the ABS to expand the Victorian NATSISS sample, fulfilling a 2006 Government commitment to undertake an Aboriginal Child Health and Wellbeing Survey. The NATSISS results are expected to be available from late 2009.

Teenage birth rate

Births, Australia, is published annually and provides data on Indigenous births, births to Indigenous women and non-Indigenous births.

Future editions of the report could investigate the availability of data on teenage fathers and discuss teenage fathers and the risks they and their children face relative to non-teenage fathers.

Birthweight

Reported births in the Indigenous population only include births to Indigenous mothers, and do not include births to Indigenous fathers and non-Indigenous mothers. Hence, these figures underestimate the total number of Indigenous babies born in a given period. From January 2009 Victoria commenced recording the Indigenous status of babies, as distinct from that of the mother. The mother is asked if the baby is Aboriginal or Torres Strait Islander.

Basic skills for life and learning

There are limited data on child health checks. Child health checks for four year old children (MBS item numbers 709 and 711) were only introduced in 2008. Data on these items may be available for future reports.

The national roll out of the AEDI commenced this year. Indigenous and non-Indigenous data should be available for the next report.

Hearing impediments

Only limited data are available on the burden of hearing loss in Indigenous children. Comprehensive, up-to-date data need to be collected to enable the assessment of the type and severity of ear infections in the Indigenous population and the resulting hearing loss.

The Longitudinal Study of Indigenous Children (LSIC) is being conducted by the Department of Families, Housing, Community Services and Indigenous Affairs. The LSIC will track the long term development of 2200 Indigenous children from communities across Australia. The LSIC will invite Indigenous families to participate in a series of annual interviews to better understand what affects their children's lives over time. The LSIC will collect data on hearing loss. These data may be available for the next report (Branch Manager, Research and Analysis, FaHCSIA, pers. comm., 13 January 2009).

In the first wave of the LSIC, parents will be asked whether their child has had any problems with ears or hearing in the past year. In wave two, parents will be asked whether the hearing problem their child was experiencing in wave one is still occurring. In wave two, parents will also be asked whether their child's hearing condition has been diagnosed by a doctor. The LSIC will also collect data on children hospitalised for ear and hearing problems and whether parents have had any health problems (including problems with ears and hearing) in the last year that have made it difficult for them to look after their child. These data could be useful to see whether there is a relationship between the incidence of ear and hearing problems in parents and their children (Branch Manager, Research and Analysis, FaHCSIA, pers. comm., 13 January 2009).

The 2008 NATSISS collected information about the prevalence and treatment of ear and hearing problems in Indigenous children. These data will be available from late 2009.

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